SOUTHERN POWER AND INDUSTRY

Ad Index, page 146

DECEMBER, 1954

In This Issue

Power Show Preview

Starts page 90

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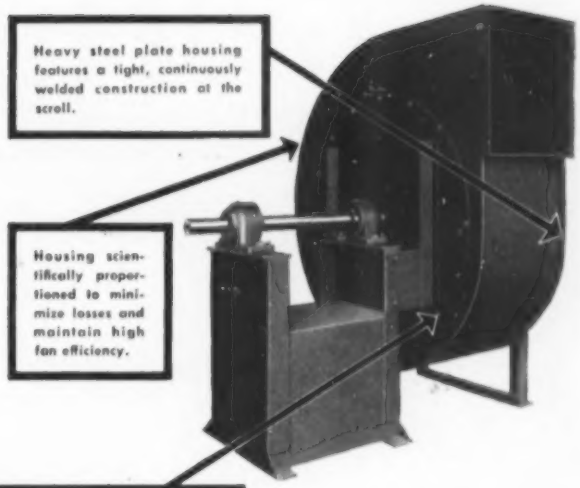
Volume 72 Number 12

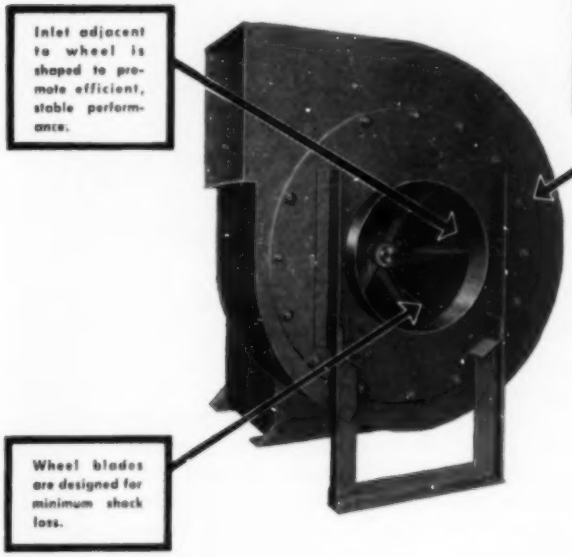
Announcing

the new Clarage TYPE XL Industrial Fans

Exceptional Fan Equipment distinguished by:

1. High efficiency characteristic.
2. Rugged, tight construction.
3. Three interchangeable wheels — each with radial blades.
4. Large size range — 11" through 60" inlet diameters.
5. Pressures to 18" SP; volumes to 130,000 CFM.





Type XL fans shown here are typical of the smaller sizes which provide universal discharge. Larger sizes are of reinforced sheet steel and base angle construction extending to the foundation line.

Send for Bulletin 702

A new, modern design offering many distinct advantages!

Clarage Type XL industrial fans are particularly well suited for diversified air and material handling applications. You'll profit from the high efficiency, in-the-field adaptability, and numerous other features of this exceptional fan equipment.

Learn more about these distinguishing features by requesting Bulletin 702, or contacting the nearest Clarage application engineering office.

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Headquarters for Air Handling and Conditioning Equipment

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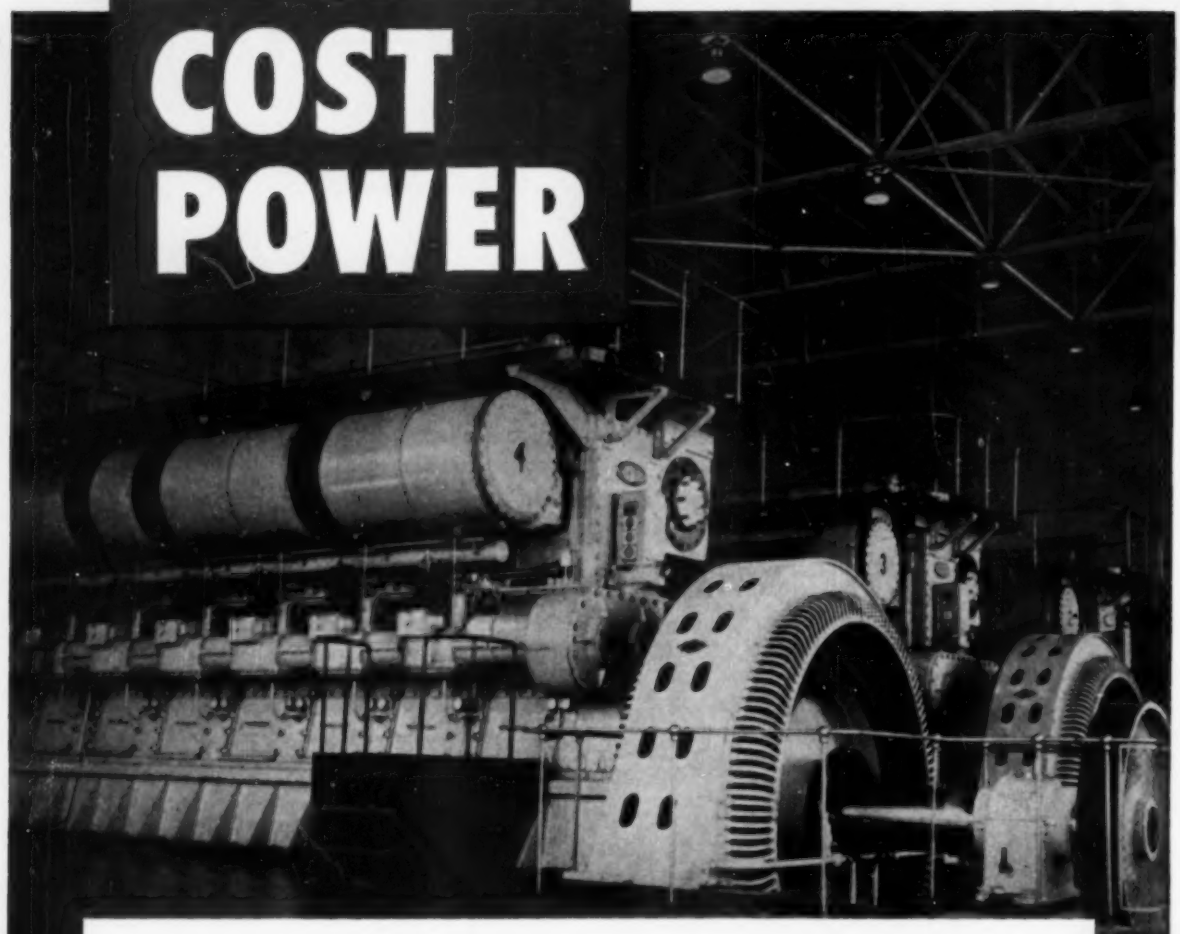
LOWER COST POWER



HERE'S HOW you can reduce your diesel maintenance costs and cut your fuel consumption: Lubricate with one of the famous *Texaco Ursa Oil* series—the one that's exactly right for your engines and operating conditions.

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Best evidence that Texaco delivers these benefits is this fact—

For over 20 years, more stationary diesel horsepower in the U. S. has been lubricated with Texaco than with any other brand.

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FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES

SOUTHERN POWER AND INDUSTRY

DECEMBER 1954

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W. J. Rooke, Chairman of the Board; R. P. Smith, President; T. W. McAllister, Vice-President; E. W. O'Brien, Vice-President; A. E. C. Smith, Vice-President.

Feature Articles in This Issue

Design, Operation and Maintenance

Helping the Man-in-the-Plant

Regular Features — Departments

Contents indexed regularly by Engineering Index, Inc.

Editorial and Executive Offices: SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E. ATLANTA 5, GEORGIA

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

December, 1954

► UNOX PENETRANT developments in the FIRE PREVENTION FIELD indicate more economical protection for large tanks and manufacturing areas, often left unprotected because of the cost of installing water spray systems.

Technique involves aeration of a 1% solution of Unox fire-fighting penetrant (Carbide & Carbon development) in equipment that is readily available. Resulting foam, in which the penetrant has reduced the surface tension of the water, has about 10 times the volume of the original solution and provides maximum cooling efficiency when applied to actual fires.

Foam system reduces amount of water needed to put out a fire by about 60%. Foam returns to original liquid state leaving no residue. The Unox Company of Houston, Texas, is now designing FLUID INSULATION SYSTEMS for one point application--proportioner, foam maker and discharge device. Watch for case studies in future issues of SP&I.

► BOILER PLANT MODERNIZATION at Liggett & Myers Tobacco Co., in Richmond, Virginia, is featured in this issue. Original plant had three boilers fired by stokers. Process steam demand required the use of three boilers maximum and two as a minimum. With two of the boilers in a battery setting, there was no opportunity to make any major repairs in the common wall. Additional capacity was needed.

Liggett & Myers engineers cite the following advantages of the new boiler and spreader stoker installation: better combustion, higher efficiency, adequate smoke control, reduced coal and ash handling, and more constant pressure at high rating.

► "FOLLOW THE COMPASS" is the frequently quoted "catch-phrase" of North Brothers, Southeastern industrial insulation contractors of Atlanta, Georgia. North Brothers "followed the compass north recently" and now have what is believed to be one of the LARGEST SINGLE ORDERS FOR INSULATION ever placed in the electric industry's history.

The contract, approaching $4 million, covers furnishing and applying thermal insulation to the 11 steam generators, piping and equipment in the Ohio Valley Electric Corporation's two new steam-electric generating stations. Insulating materials used will be Fiberglas and "Kaylo" supplied by Owens-Corning Fiberglas Corporation.

► CAN BARK AND COAL be burned simultaneously? The Champion Paper and Fibre Company have proved it with a new spreader stoker installation at their Canton, North Carolina, plant.

Outstanding features to be reported in a future issue of SP&I include: the firing of bark without any form of beneficiation; the firing of bark directly as it is received from the barking drums without any storage; the firing of bark and coal singly or in combination of various proportions; and operating the unit by application of automatic controls.

(Continued on page 6)

MAKE YOUR OWN TERMINAL STRIPS

with these handy

BULLETIN 892 TERMINAL BLOCKS

EASILY MADE UP IN ANY LENGTH TO MEET YOUR TERMINAL STRIP SPECIFICATIONS

Bulletin 892 terminal blocks interlock in perfect alignment to provide the exact number of terminals for any panel board. There are no excess terminals—hence, no waste of panel space. The required terminal strip can be assembled quickly and mounted on the panel with hold-down bolts. Plastic barriers separate the clamp-type terminals which have lock washers.

One end block and any number of terminal blocks may be hooked together. In general, every 13th block is used to secure a long terminal strip to the panel.

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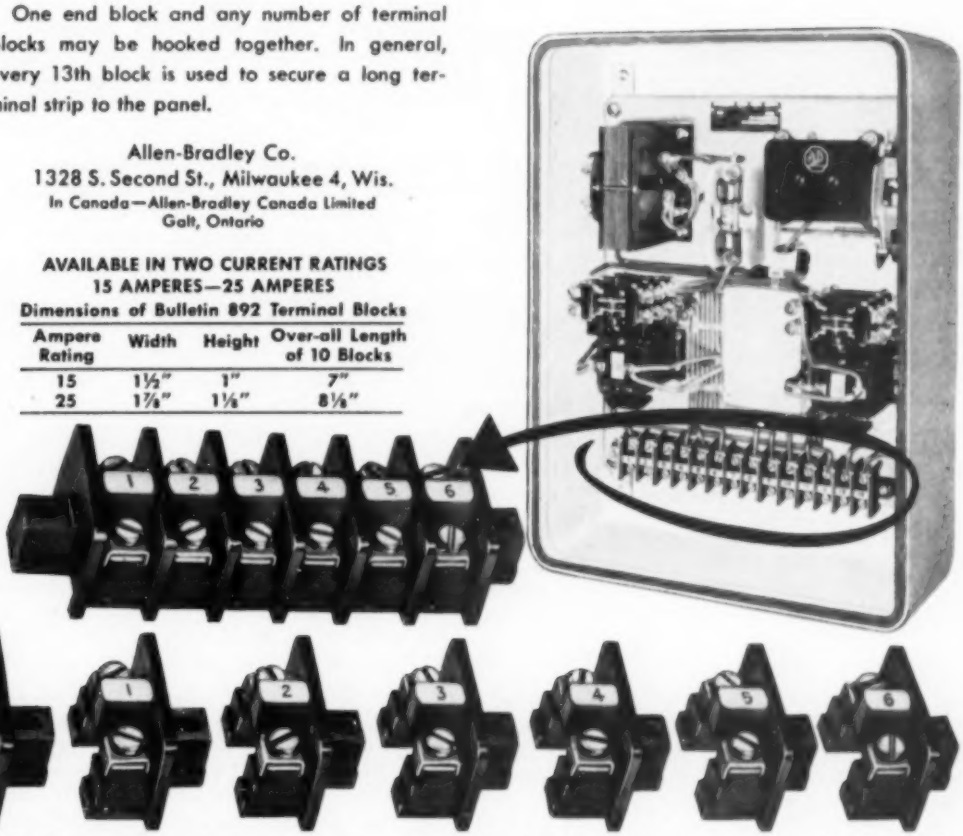
1328 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Limited
Galt, Ontario

AVAILABLE IN TWO CURRENT RATINGS
15 AMPERES—25 AMPERES

Dimensions of Bulletin 892 Terminal Blocks

Ampere Rating	Width	Height	Over-all Length of 10 Blocks
15	1½"	1"	7"
25	1⅞"	1⅛"	8⅛"



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BIRMINGHAM—W. H. Beaven, 300 So. 23rd St., Tel: 7-5479
CHARLESTON—W. J. Hess, Room 302 Morrison Bldg., 815 Quarrier St., Tel: 2-5323
CHARLOTTE—Le Roy P. Spoon, 307 Lincoln St., Tel: 4-6334
DALLAS—J. K. Webb, 2810 McKinney Ave., Tel: TEnison 6179
HOUSTON—Wilson Electrical Equip. Co., 2930 Commerce Ave., Tel: Atwood 1557
JACKSONVILLE—Robert P. Smith Co., 2031 Hendricks Ave., Tel: 9-9474
KANSAS CITY—B. L. McCreary & Son, 1819 Central St., Tel: Harrison 1668
KNOXVILLE—Bowditch & Co., 1311-C N. Broadway, P. O. Box 3145, Tel: 4-2513
LITTLE ROCK—Curtis H. Stout & Co., P. O. Box 107, 400 Shall St., Franklin 4-8201
LOUISVILLE—Rietze & Co., 139 S. 5th St., Tel: Clay 7716-7
MEMPHIS—Curtis H. Stout & Co., 718 M & M Bldg., Tel: 8-7601
MIAMI—Lee-Smith Co., 121 S.E. First St., Tel: 82-6766
NEW ORLEANS—Robbins & Robbins, 1037 Magazine St., Tel: Canal 5805
PHOENIX—James A. Setchell Co., Inc., 2115 S. 15th Ave., Tel: Alpine 2-9388
RICHMOND—H. M. Wood & Co., 2016 Second Ave., Tel: 3-8529
ST. LOUIS—G. W. Schaichlin, 904 N. Grand Blvd., Tel: Jefferson 3-1901
SAN ANTONIO—Wilson Elect. Equip. Co., 101 E. Maple St., Circle 4-2344
SAN DIEGO—James A. Setchell, 301 W. "G" St., Tel: Belmont 3-3981
TULSA—John W. Elder Co., 1526 East Fourth St., Tel: 3-9149

facts and trends (continued from page 4)

► WATER HEADER PIPE REPAIRS at Celanese Corporation's Bishop, Texas, plant were recently made with POLYESTER RESIN. About 40 ft of pipe had eroded, with large holes in some areas and the balance of the pipe rusted almost paper thin. There were about 20 holes below the water level of the pipe, which normally runs half full.

Scale was knocked off and two plies of glass cloth, saturated with a self-curing blend of polyester resin were applied over the large holes. Smaller leaks were plugged. Two additional plies of resin saturated glass cloth were then wrapped about the entire rusted pipe, one at a time. Material costs were only $137 and it was unnecessary to remove the multiple connections or the pipe.

► WATCH FOR THE TRAPS IN THE GOLD BAGS--Yarnall-Waring Company has produced its one millionth Yarway Impulse Steam Trap. To commemorate the event, Yarway is specially packaging in gold bags, 100 standard traps and including them at random in regular shipments throughout the country. Recipients of these traps will receive special prizes.

► REFINED "HOTFOOT" shoos roosting birds. Troubled with the noise and mess that pigeons and starlings make when they roost on your window sill or roof top? Latest preventive maintenance technique is "Roost-No-More" Bird Repellent available in 10-ounce aerosol containers at your hardware store or building maintenance supply dealer.

Repellent, dispensed on likely landing places as a ribbon of foam, is a gelatin compound harmless to birds but mighty disagreeable underfoot. Will cling to any building material and is claimed to remain effective for a year or more. A $2.50 container will protect about 15 lineal feet when applied properly.

► ALUMINUM CLAD STEEL WIRE production on a commercial basis is being scheduled by Alcoa. The new ACSW has been tested extensively in the field as the neutral in self-supporting service drops (modern type of house drops). The wire is especially suitable as the neutral in this application because it offers the advantage that it can be readily wrapped around itself at terminal points. Possibilities for use in the communications and electric utilities fields are also seen.

► ATOMIC ENERGY is a mammoth new industry which will eventually affect nearly all industrial activity. Have you been examining your company's position in this rapidly expanding field? What's happening and where can one find out about it?

Finding what you want to know can be an exasperating and time-consuming task without an effective guide through the tons of papers and books devoted to atomic energy. Many publications are intended for experts; others to theoretical physicists. However, there is a wealth of useful information written so that the non-specialist (you and I) can understand it and apply it to our own and company's advantage.

SP&I's January issue will present a "title-source-price" tabulation covering general developments, radioactive isotopes, atomic power, and business opportunities. In preparing the guide, John F. Lee, SP&I's Atomic Energy Consultant and Prof. of Mechanical Engineering at North Carolina State, included categories likely to be of interest to the general industrial and power user.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

What are the advantages of a WATERSPHERE?

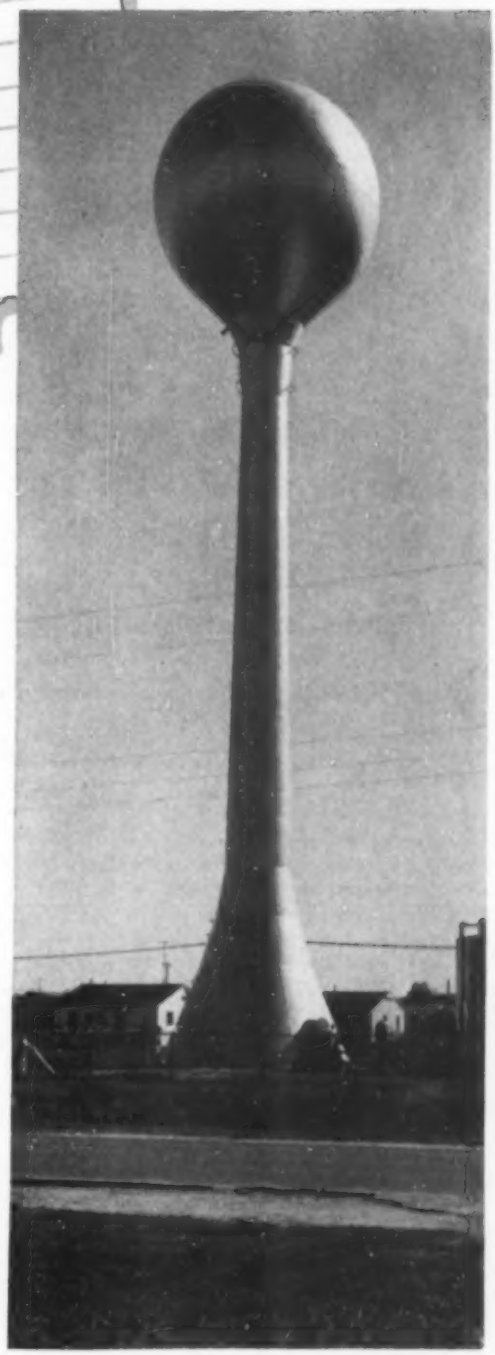
The main advantages of a Horton Watersphere® are:

1. They take up less ground space than conventional elevated tanks.
2. There is less surface area to paint and maintain.
3. The base may be used as a pump house or for other storage purposes.
4. The modern, streamlined Watersphere lends an up-to-date look to the community or plant where it is installed.

In addition to the above benefits, here is a typical case history to show why Waterspheres are increasing in popularity in municipal as well as private water systems. A 100,000-gallon Watersphere installed in the municipal water system at South Houston, Texas, helped reduce pressure variations and increased minimum distribution pressures 15 lbs. per sq. in. throughout the entire system. The city now has more water on hand at all times for fire protection and other emergencies. Frank J. Metyko, of Houston, Texas, was consulting engineer on the job.

Waterspheres are built in standard capacities from 25,000 to 250,000 gallons. Write our nearest office for further information and quotations.

Right: 100,000-gallon Horton Watersphere installed for municipal water service at South Houston, Tex.



CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2180 Healey Bldg.
Birmingham 1.....1531 North Fiftieth St.
Boston 10.....1044—201 Devonshire St.
Chicago 4.....2107 McCormick Bldg.
Cleveland 15.....2218 Midland Bldg.
Detroit 26.....1534 Lafayette Bldg.
Houston 2.....2132 C & I Life Bldg.
Los Angeles 17...1545 General Petroleum Bldg.
New York 6.....3312—165 Broadway Bldg.
Philadelphia 3....1646—1700 Walnut St. Bldg.
Pittsburgh 19.....3252 Alcoa Bldg.
Salt Lake City 4.....545 W. 17th South St.
San Francisco 4.....1531—200 Bush St.
Seattle 1.....1345 Henry Bldg.
Tulsa 3.....1628 Hunt Bldg.

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, *and* GREENVILLE, PA. *In Canada*—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

NEWS *for the South and Southwest*

Atlantic Steel's **John Butler**, International Nickel's **Robert J. Raudebaugh**, Chicago Bridge and Iron Company's **G. S. Sangdahl, Jr.**, and Ingalls Shipbuilding Corporation's **T. J. Dawson**, speaking at various sessions of the 4-day conference. **John Butler** of Atlantic Steel's Warehouse Division is Chairman of the Georgia Chapter, ASM; **Dr. Robert Raudebaugh** (formerly of Georgia Tech) is research metallurgist, International Nickel Co., Bayonne, N. J. and National Trustee of the American Society for Metals.

Southern Metals Conference—Atlanta

Diversification and healthy, rapid growth keynoted in four day meeting sponsored by American Society for Metals. New materials and methods discussed.

Attracting a top quality registration of 144, Ninth Annual SOUTHERN METALS CONFERENCE held recently in ATLANTA, GEORGIA, featured active participation by representatives of the eight sponsoring Southeastern Chapters of the American Society for Metals—Birmingham, Carolinas, Chattanooga, Georgia, Jacksonville, New Orleans, Oak Ridge, and Savannah River Chapters.

Seven technical sessions were supplemented by extensive plant tours of Atlanta's Ford Motor Company and Atlantic Steel Company, and Lockheed Aircraft Corporation at Marietta, Georgia.

Recent Carilloy T-1 Pressure Vessel Testing Summarized

G. S. SANGDAHL, JR., metallurgical engineer, CHICAGO BRIDGE AND IRON COMPANY, Birmingham, Alabama, presented a very interesting discussion and color movies of U. S. Steel-Chicago Bridge joint tests on commercial pressure vessels made from Carilloy T-1, a new high-yield strength alloy steel.

The new alloy provides industry with a steel plate of unusual properties. This material makes use of a combination of alloying elements and low carbon content to provide a tempered martensitic structure of high strength, excellent low temperature properties and good welding characteristics.

Mr. Sangdahl's discussion and movies demonstrated the fitness of quenched and tempered plate for the construction of pressure vessels; the propriety of utilizing the great strength potential of this type of steel; and the desirability of design-

H. A. Caldwell, chief quality control metallurgist, T.C.I., Fairfield, Ala.; **Dr. J. B. Austin**, national president ASM and assistant vice-president of fundamental research, U. S. Steel; and **E. A. Brandler**, Electro Metallurgical Co., Birmingham, Ala.

Conference committee included: **Michael F. Wiedl, Jr.**, Atlantic Steel Company, Atlanta, Georgia; **Ab Flowers**, Combustion Engineering, Inc., Chattanooga, Tenn.; **Ralph Carlson**, American Cast Iron Pipe Co., Birmingham, Ala.; **Howard F. Blackwood, Jr.**, Winston-Salem, N. C.; **Commander Harry J. Huester**, Naval Air Station, Jacksonville, Florida; **Perry Jones**, Rheem Manufacturing Company, New Orleans, La.; **Anton Brasunas**, University of Tennessee, Knoxville, Tenn.; and **Joseph Drian**, North Augusta, South Carolina.

ing on the basis of yield strength rather than ultimate strength.

Welding Processes Discussed

ALBERT FAIRCHILD, metallurgical engineer, WESTERN ELECTRIC COMPANY, Winston-Salem, North Carolina, discussed the metallurgical considerations and engineering controls for the thermal unions of metals to aircraft quality. Processes, fusion welding, controls, brazing, soldering and distortion were highlighted with continual emphasis on cleanliness.

T. J. DAWSON, chief metallurgist and director of research, INGALLS SHIPBUILDING CORPORATION, Pascagoula, Mississippi, presented a highly illustrated discussion on "Quality Control of Heavy Weldments."

PETER PATRIARCA, metallurgist, Oak Ridge National Laboratory, Oak Ridge, Tennessee, proved a very well informed metallurgist and accomplished speaker on the subject "Welding Practice at Oak Ridge National Laboratory." He discussed procedures used to successfully fabricate a number of complex heat exchangers for unusual and extremely rigorous service conditions. The selection of joining materials and methods was based on results of welding and brazing research for elevated temperature applications. Results revealed the importance of coordination of effort between research and production.

Michael F. Wiedl, Jr., of Atlantic Steel Company's Advertising Department and General Chairman of the Southern Metals Conference, greets J. L. Scott, E. E. Stansbury and Anton Brasunas of the University of Tennessee.

LEONARD A. ABRAMS, materials engineer, Reactor Materials Branch of the A.E.C., Augusta, Georgia, showed why the operation of nuclear reactors have posed many new materials problems for the metallurgist. The behavior of materials of construction—fuels, targets, moderators and controls, present unique problems.

WALTER C. LONG, assistant director, Tennessee Industrial and Agricultural Commission, Nashville, Tennessee, highlighted metalworking and general industrial developments in Chattanooga and other metalworking centers of the state. (See Industry Speaks in this issue for an abstract of Mr. Long's comments.)

THOMAS W. PEACOCK, superintendent, Florida Machine and Foundry Company, Jacksonville, Florida, presented a similar discussion on the tremendous growth in metalworking activity in that area.

J&L Expansion—Texas

JONES & LAUGHLIN STEEL CORPORATION has announced plans for construction of a new Container Division plant and office, to be located on the same property as its present plant, at Sabine Highway No. 87, WEST PORT ARTHUR, TEXAS.

The equipment now used for producing steel drums will be moved into the new building, which will be about 38,000 sq ft in size. The present plant will be used for warehouse space. The site is located on the ship channel across from Gulf Oil Corporation marine docks.

New equipment to be housed in the projected building will include a unit for cleaning and phosphatizing the drums inside and outside. Another new piece of equipment in the plant will be a paint baking oven, to produce high-bake interior linings for the drums.

JOHN H. MCCORKLE is plant manager.

Diamond Alkali—Alabama

Three key men in DIAMOND ALKALI COMPANY were recently appointed to top positions at the company's MUSCLE SHOALS, ALABAMA, plant, which was purchased from the government.

STEVE PUSCHAVER is plant manager; J. R. HORACEK has been named assistant plant manager; and JOHN W. WHITTLEMAN is personnel manager. The three assumed their posts when Diamond took possession of the plant late in October.

More News—Page 118

FUTURE EVENTS
Of Engineering Interest

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Sec'y, 29 West 39th St., New York, N. Y.
Nov. 28-Dec. 3, Annual Meeting, Statler Hotel, New York, N. Y.

21st NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING, E. K. Stevens, Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
Dec. 2-7, Power Show, Commercial Museum, Philadelphia, Pa.

NATURAL GASOLINE ASSOCIATION OF AMERICA, Wm. F. Lowe, Sec'y-Treas., 422 Kennedy Bldg., Tulsa 3, Okla.
Dec. 3, Panhandle-Plains Regional Meeting, Herring Hotel, Amarillo, Texas
Feb. 25, 1955, Permian Basin Regional Meeting, Scharbauer Hotel, Midland, Texas
Apr. 13-15, 1955, 34th Annual Convention, Baker and Adolphus Hotels, Dallas, Texas

PLANT MAINTENANCE & ENGINEERING SHOW, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.
Jan. 24-27, 1955, Industrial Exposition, International Amphitheatre, Chicago, Ill.

HEATING AND VENTILATING EXPOSITION, E. K. Stevens, Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
Jan. 24-28, 1955, 12th International Heating & Ventilating Exposition, Commercial Museum and Convention Hall, Philadelphia, Pa.

INSTRUMENTATION FOR THE PROCESS INDUSTRIES, K. L. Puffer, Pub. Chm., P. O. Box 6236, Houston 6, Texas
Jan. 26-28, 1955, 10th Annual Symposium, School of Engineering, Chemical Engineering Dept., Texas A&M College, College Station, Texas

NATIONAL ASSOCIATION OF PURCHASING AGENTS, Fred D. Bradley, Chm. Public Utility Buyers' Group, Southern Union Gas Co., Burt Bldg., Dallas 1, Texas
Feb. 13-15, 1955, 24th Annual Mid-Winter Conference, Shamrock Hotel, Houston, Texas

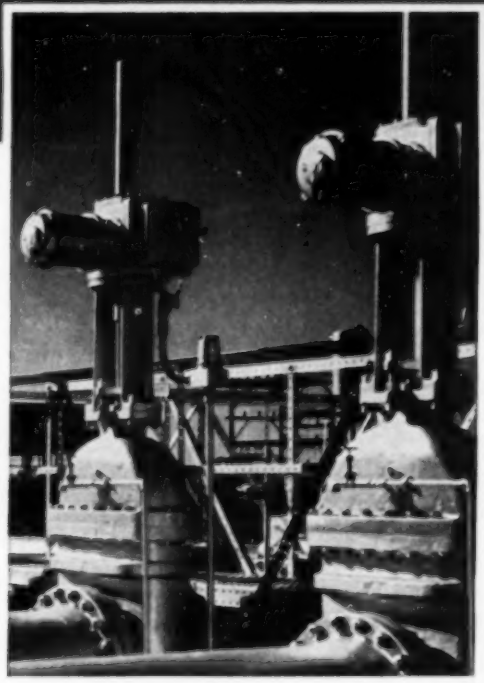
SOUTHERN SAFETY CONFERENCE, INC., W. L. Groth, Exec. Dir., P. O. Box 8927, Richmond 25, Va.
Feb. 27-Mar. 1, 1955, 16th Annual Conference and Exposition, Jung Hotel, New Orleans, La.

NATIONAL MATERIALS HANDLING EXPOSITION, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.
May 16-20, 1955, Exposition, International Amphitheatre, Chicago, Ill.

INDUSTRIAL MARKETING ASSOCIATES, INC., John Paul Taylor, Exec. Sec'y, 520 Pleasant St., St. Joseph, Mich.
May 22-26, 1955, Annual Meeting, The Cloister, Sea Island, Georgia.

AUTOMATION?
...yes, at its Best with

Limitorque®
REMOTE CONTROL



push button operation

More LimiTorques are in daily use throughout the World, than all other makes combined. LimiTorque is now adaptable to Microwave Control, if desired. Write for Catalog L-54.

See us at Booth 539
"POWER SHOW"
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Philadelphia

Throughout Industry today, there is an ever increasing demand for Automatic Control and Operation . . . to save time, labor and money . . . to assure safety and absolute dependability.
AUTOMATION is not new in valve operation, because, for over 25 years thousands of important valves have been operated by LimiTorque push-button control in Refineries, Oil and Gas Pipe Lines, Central Stations, Power Plants, Paper and Pulp Mills, Water and Sewage Plants, Chemical Plants, and on Shipboard. . . . And, LimiTorque not only opens and closes valves, but it automatically shuts-off the current, should an obstruction be encountered in closing. . . . Another feature, should there be a failure in the power lines, LimiTorque can be readily de-clutched and manually operated by the handwheel.

Serving Southern Industry from Lynchburg, Va. For catalogs or detailed information, write Virginia Gear and Machinery Corp., Lynchburg, Va., or the address below.

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Industrial Gears & Speed Reducers

LimiTorque Valve Controls

Proven On loads *UNDER* 600 Amps....

Fusetron dual-element Fuses Have an Interrupting Rating in Excess of 100,000 Amps.

An interrupting rating in excess of 100,000 amperes for FUSETRON dual-element fuses . . . this was shown by tests that were conducted under conditions that simulated the most severe field conditions. These tests were witnessed and verified by the Electrical Testing Laboratories of New York.

The test circuits were set to deliver far in excess of 100,000 amperes — yet the 250 and 600 volt FUSETRON fuses cleared the shorts without igniting readily flamable material placed around the fuses . . . and there was comparatively little noise.

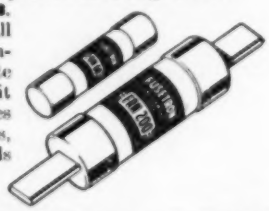
These tests show that Fusetron fuses, even in the small 30 ampere range, can interrupt safely the most severe available short circuit current.

No interference with time-lag

Time-lag is of utmost importance to give proper motor and electrical protection and to eliminate needless blowing of fuses. Even though the interrupting capacity has been greatly increased, the time-current characteristic of Fusetron fuses has in no way been disturbed.

ALL THIS ADDED SAFETY
without changing a panelboard or switch . . . plus 10 point Protection of FUSETRON dual-element FUSES!

1. Protect against short-circuits. **2.** Protect against needless blows caused by harmless overloads. **3.** Protect against needless blows caused by excessive heating — lesser resistance results in much cooler operation. **4.** Provide thermal protection — for panels and switches against damage from heating due to poor contact. **5.** Protect motors against burnout from overloading. **6.** Protect motors against burnout due to single phasing. **7.** Give double burnout protection to large motors — without extra cost. **8.** Make protection of small motors simple and inexpensive. **9.** Protect against waste of space and money — permit use of proper size switches and panels. **10.** Protect coils, transformers and solenoids against burnout.



Fusetron Fuses Help eliminate needless Shutdowns for Production Engineers.

Work stoppages caused by needless blows are prevented. Even if all the motors on a circuit start at one time or other harmless overloads occur, the fuse link holds to prevent a shutdown.

Likewise, Fusetron fuses guard against needless blows caused by excessive-heating in panelboards and switches—lesser resistance results in cooler operation.

Fusetron Fuses Offer Maximum Safety for Electrical and Safety Engineers.

With an interrupting rating of 100,000 amperes, Fusetron fuses give the greatest possible protection against damage due to short-circuits. And just as important, they reduce the hazard of motor burnouts due to single phasing and overloading.

Fusetron Fuses Save Time and Work for Maintenance Engineers.

Once properly installed, Fusetron fuses require no costly inspection time or down-time for calibration and other maintenance necessary on mechanically operated devices.

Unnecessary repair work on motors is avoided because Fusetron fuses reduce to a minimum the danger of damage due to electrical faults. If trouble occurs, instead of rewinding or replacing burned out motors, simply replace Fusetron fuses.

Switches and panelboards are protected against damage from poor contact heating.

Fusetron fuses also protect against needless blows that cause irritating interruptions of regular maintenance.

Proven On loads *ABOVE* 600 and up to 5,000 Amps.

BUSS Hi-Cap Fuses Have an Interrupting Rating In Excess of 100,000 Amps. . . *and their blowing time can be coordinated with that of Fusetron fuses.*

An unlimited interrupting rating for BUSS Hi-Cap fuses on any voltage up to 600 . . . this was confirmed by tests reported by the Electrical Testing Laboratories of New York.

BUSS Hi-Cap fuses are designed to give protection against dangerous overloads as well as high fault currents — yet retain the speed of operation necessary to limit heavy short currents to safe values.

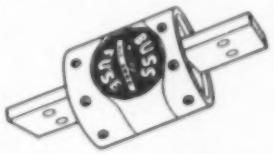
When coordinated properly with Fusetron dual-element fuses they will not open ahead of the fuse nearest to the fault — thus the trouble is isolated to the part of the circuit in which the fault occurs.

Added SAFETY on Old Installations

On installations where the increase in the capacity of the circuit has outgrown the interrupting rating of the circuit breakers, BUSS Hi-Cap fuses offer a safe and relatively inexpensive way to protect inadequate breakers against rupture in event of bad fault.

ACTION THAT SAVES YOU MONEY

Don't risk losses. Delay may cost you far more than replacing every fuse with a FUSETRON fuse. By passing the word along that all purchase and stock records should call for FUSETRON dual-element fuses on loads up to 600 amperes — and BUSS Hi-Cap fuses on loads above that, you get action that begets money saving.



On New Construction tell your architect to specify this Safer, Better Protection.

Fusetron Fuses Cuts Cost for Top Management.

Cuts maintenance cost — Fusetron fuses are maintenance free.

Cuts motor repair cost — Fusetron fuses guard the motor, against damage due to overloading, single phasing, short circuits and other electrical faults.

Cuts production costs — Shutdowns due to needless blows are eliminated.

Cuts new installation costs — Smaller sizes can be used, therefore big savings can be made on switches and panelboards.

Cuts present installation costs — Fusetron fuses hold and won't open on starting currents so the need for larger panelboards and switches is often eliminated — and in many cases new motors can be added to the circuit without installing larger panelboards or switches.

Play Safe—Install Fusetron Fuses and BUSS Hi-Cap Fuses now!

For blowing time charts or more information on FUSETRON fuses and BUSS Hi-Cap fuses use coupon or write for bulletin FIS and HCS.

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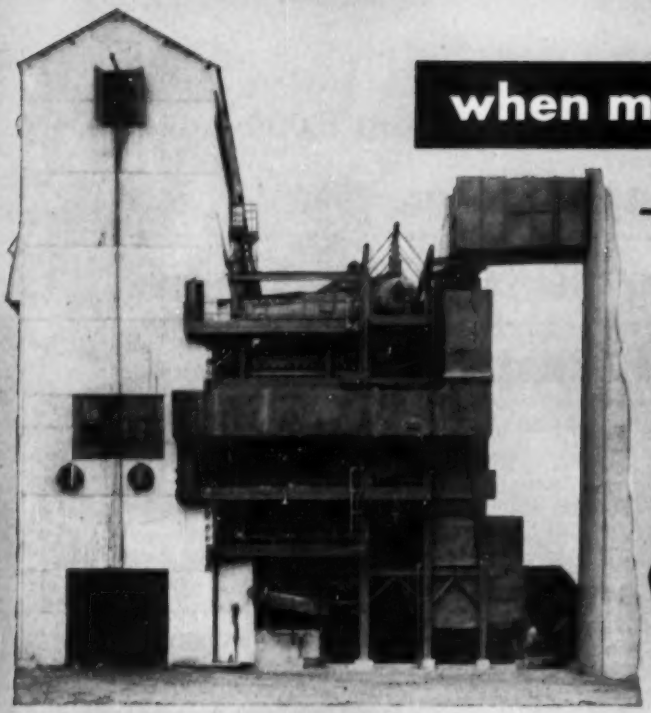
when more steam was needed



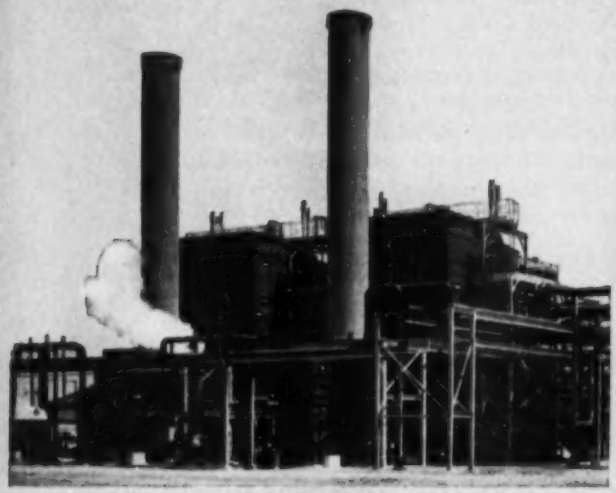
from 1935 to 1954 Shell Oil Company purchased 1,650,000 lbs./hr. steam capacity in Riley Steam Generating Units

Installed at Wood River, Illinois

1935 - One 50,000 lbs./hr. Outdoor Unit
400 psig - 450 F - Natural Gas Fired.

1940 - One 125,000 lbs./hr. Semi-Outdoor Unit.
650 psig - 750 F - Pulverized Coal Fired
Riley Pulverizer - Riley Flare Type Burners

1942 - Duplicate of Above Unit

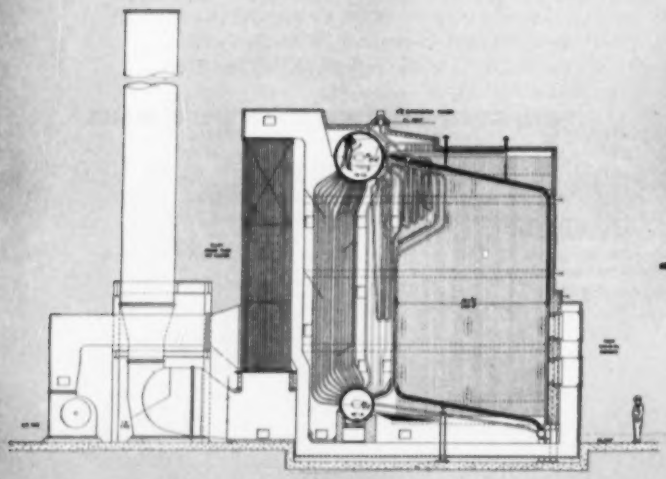


Installed at Deer Park, Texas

1950 - Two 250,000 lbs./hr. Outdoor Units
650 psig - 750 F Oil, Gas Fired

Installed at Wood River, Illinois

1952 - Two 250,000 lbs./hr. Outdoor Units
650 psig - 750 F Oil, Gas Fired



To be Installed at Anacortes, Wash.

1954 - Two 175,000 lbs./hr. Riley RX Type
Outdoor Units
650 psig - 750 F Oil Fired
Bechtel Corporation, Engineers

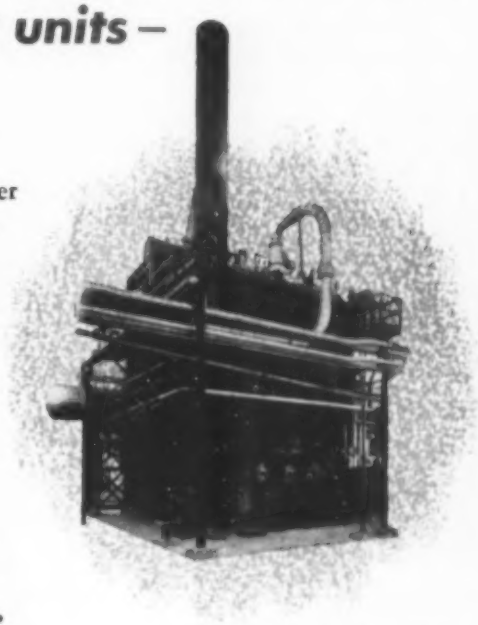
A survey of your power plant by a consulting engineer will possibly show ways of making surprising changes in your power costs.

SHELL remembered RILEY

and ordered its eighth and ninth Riley outdoor units –

Two decades, a significant period in the growth of the boiler industry, have passed since Riley installed this outdoor unit at Shell Oil Company's Wood River, Illinois refinery. Today this compact unit is still perking along, come rain, shine, snow or cold winter winds . . . still producing the 50,000 lbs./hr. of steam, 400 psig, 450 F for which it was designed.

As Shell expanded and added new oil refining and chemical manufacturing facilities, and when new steam generating equipment was specified, Shell power engineers remembered their first Riley outdoor unit . . . its dependability and continuity of operation. Shell's eighth and ninth Riley units will soon be installed at its new plant at Anacortes, Washington.



- 50,000 lbs./hr. Outdoor Unit
400 psig. 450 F - Natural Gas Fired
at Shell's Wood River, Ill. Refinery.

This record of repeat orders for Riley units is sound proof of the dependability of Riley equipment

Hooker Electrochemical Co. - 7 Orders
Celanese Corp. of America - 15 Orders
Dow Chemical Company - 13 Orders
Carbide & Carbon Chemicals - 13 Orders
Allis Chalmers Mfg. Co. - 6 Orders
Central Ohio Light & Power Co. - 6 Orders
Gulf Power Company - 4 Orders
Central Illinois Light Co. - 5 Orders
Houston Light & Power Co. - 9 Orders

Esso Standard Oil Co. - 7 Orders
Iowa-Illinois Gas & Electric - 5 Orders
Interstate Power Co. - 5 Orders
Kennecott Copper Co. - 6 Orders
Masonite Corp. - 6 Orders
Public Service Co. of Indiana - 5 Orders
U. S. Steel Co. - 10 Orders
Swift & Company - 10 Orders
Standard Oil Co. of California - 12 Orders

Otter Tail Power Co. - 6 Orders
Ohio Edison Co. - 4 Orders
Curtis Wright Corp. - 7 Orders
Publicker Industries - 4 Orders
Container Corp. - 4 Orders
Beechnut Packing Co. - 4 Orders
Gaylord Container Co. - 4 Orders
Monsanto Chemical Co. - 4 Orders
West Virginia Pulp & Paper - 5 Orders

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Continued on page 142

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SOUTHERN POWER AND INDUSTRY
806 Peachtree St., N. E.
Atlanta 5, Ga.

List Items You Want, Tear Out and Mail One of the Attached Cards Now!

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.

USE MONORAIL CRANES

. . . Where Space is Limited

. . . To Handle Variable Jobs

. . . For Low Maintenance Cost

These are just a few reasons why American MonoRail Cranes are gaining in popularity and are being installed in increasing numbers of plants the country over. Call in your American MonoRail representative and have him tell you all the advantages of MonoRail Cranes such as—ease of handling—smooth travel—strength—safety interlocks—power operation and **interlocking carrier service between and beyond the craneways.** Consultation in connection with any handling problem is available without obligation.

Send for your copy of C-1 Bulletin

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13105 ATHENS AVENUE • CLEVELAND 7, OHIO

Maybe you're not from Missouri...

but let BELL & ZOLLER show you why

Superwashed coals are the best!

You will discover that Bell & Zoller's *Superwashed* ORIOLE is super-clean, a free burning, low ash, low moisture coal that is correctly sized to meet your specific requirements—to keep boiler efficiency *up* . . . steam costs *down!* Shipped economically from the No. 11 seam in Western Kentucky via rail or combined rail-inland waterway routes. We assure you of complete satisfaction . . . and stake our reputation on it!

COAL HEATING SERVICE

BELL & ZOLLER COAL COMPANY

BELL BUILDING, CHICAGO 1, ILLINOIS

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Sixty-Eight Years of Service to Coal Users

Producers of
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Sales Agents for

Otter-Creek-Eagle Coal Co.
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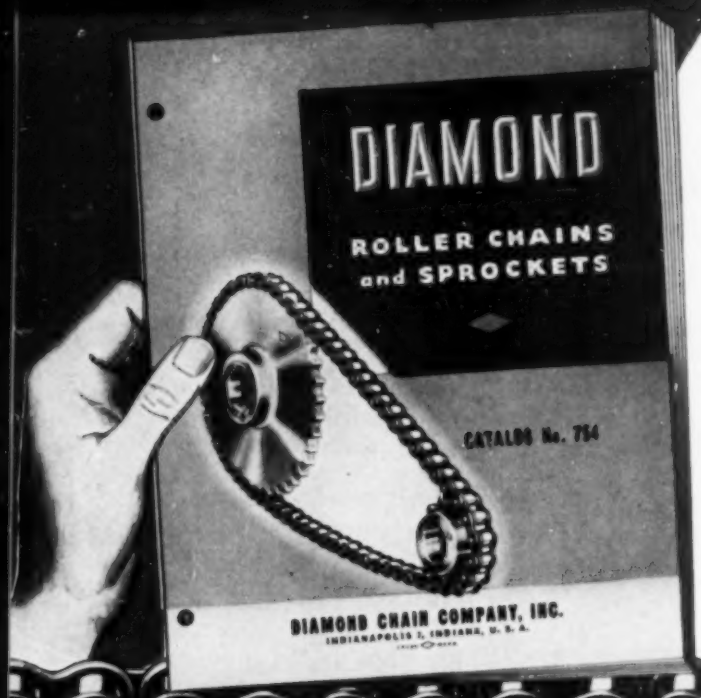

Here's the Very Latest on Roller Chains 64 Pages of Important Data and Information

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● In this new complete catalog are data and information compiled by our engineering department—information based on 65 years of experience in the production and application of Roller Chains and Sprockets for power drives, secondary drives, timing, lifting, conveying, coordination of several machinery functions, etc.

A CONSTANT HELP— A READY REFERENCE

Here is a compact source of information and data on stock Roller Chains and Sprockets. Engineers and production men will find this comprehensive 64-page Catalog 754 is a time-saver in selection and correct application. Write today, or mail the coupon for a copy.

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DIAMOND ROLLER CHAINS

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Please mail a copy of your New Catalog 754 to:

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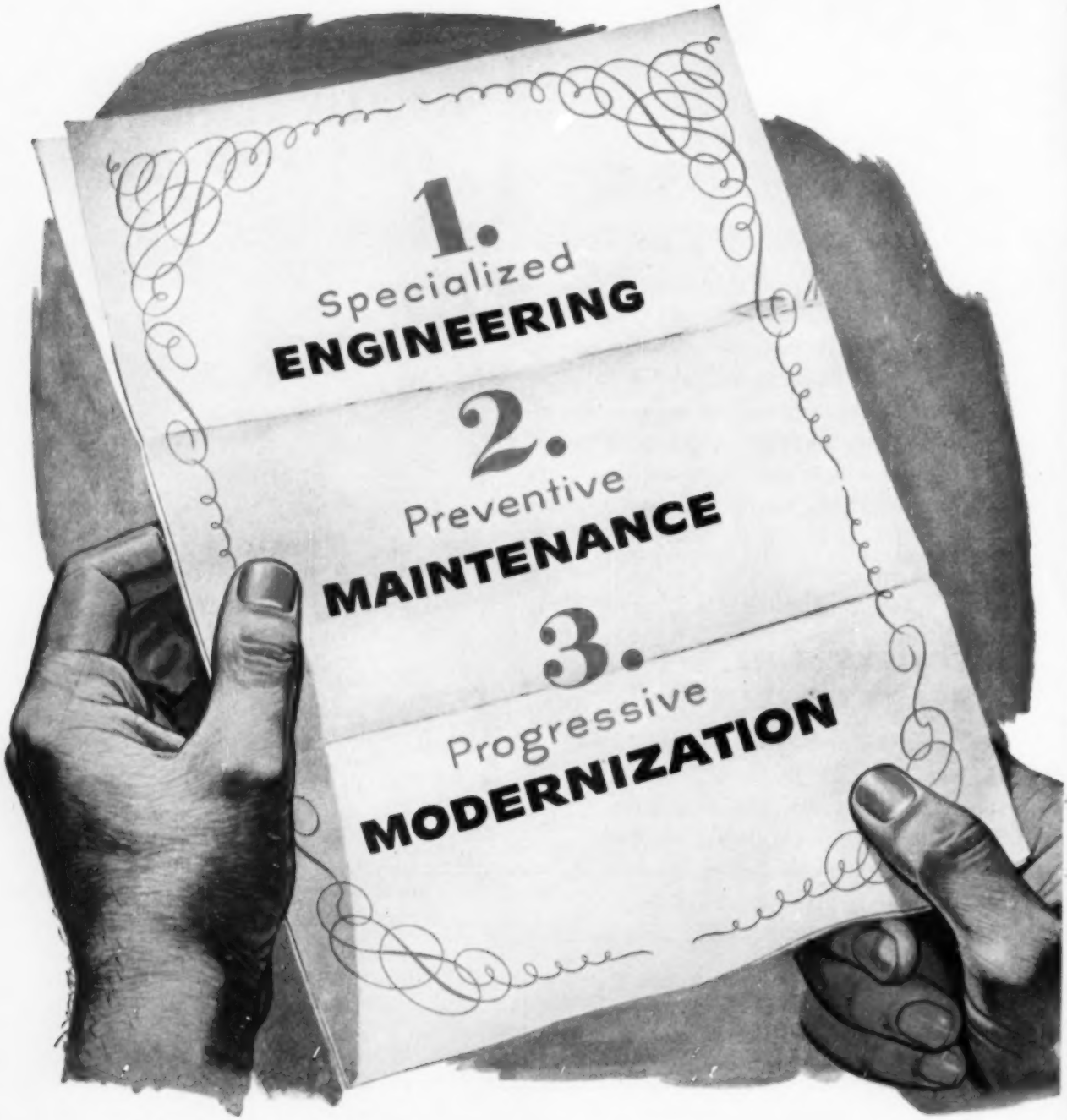
Always-On-Duty

OTIS GENERAL DUTY FREIGHT ELEVATORS

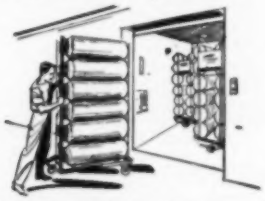


"INSURANCE"

HAVE THREE EXTRA FACTORS OF SAFETY

Whenever you need a freight elevator, it should be on duty. It's like a watch. If it isn't running it's useless. And costly. Especially when lack of elevator service holds up a production or materials handling line, or warehouse delivery trucks, or automobile parking, or mining, etc.

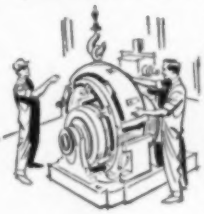
You can save money in the long run with Otis general duty freight elevators. They're standardized. They have lifting capacities of 2,500 up to 10,000 lbs. or more. And full safety features, power doors, self-service or attendant operation.



Only Otis freight elevators can offer you always-on-duty "insurance." It's based upon these 3 extra factors of safety.

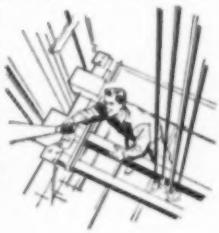
1 Specialized ENGINEERING

Otis hoisting machines, which are the heart of the installation, are not adaptations of standard commercial equipment. Like every other part of an Otis installation, they're specifically designed to meet the unique requirements of elevator service. And every part is built in Otis plants under rigid quality control. All with a basic knowledge of elevatoring that can't be matched.



2 Preventive MAINTENANCE

Otis maintenance keeps Otis freight elevators performing like new—*year after year!* Otis service is *engineered-service by the maker* that prevents slowdowns and breakdowns; extends elevator life by 50%; eliminates expensive, unexpected repair bills; keeps replacement parts available over 60 years; supplies field-trained men having an aggregate of 21,500 years' elevator experience; provides 24-hour-a-day service on a nationwide basis through 268 offices. All, because we never lose interest in the performance of an Otis installation.



3 Progressive MODERNIZATION

An Otis freight elevator need never become obsolete. New developments are made applicable to existing installations. We strongly recommend planned, progressive modernization as always-on-duty "insurance."

AUTOMATION

You can have freight elevators where you want them, when you want them. The same advanced electronic skill *that developed AUTOTRONIC® completely automatic operatorless elevators for busy office buildings* is ready to make completely automatic freight elevators an integral part of your production line.

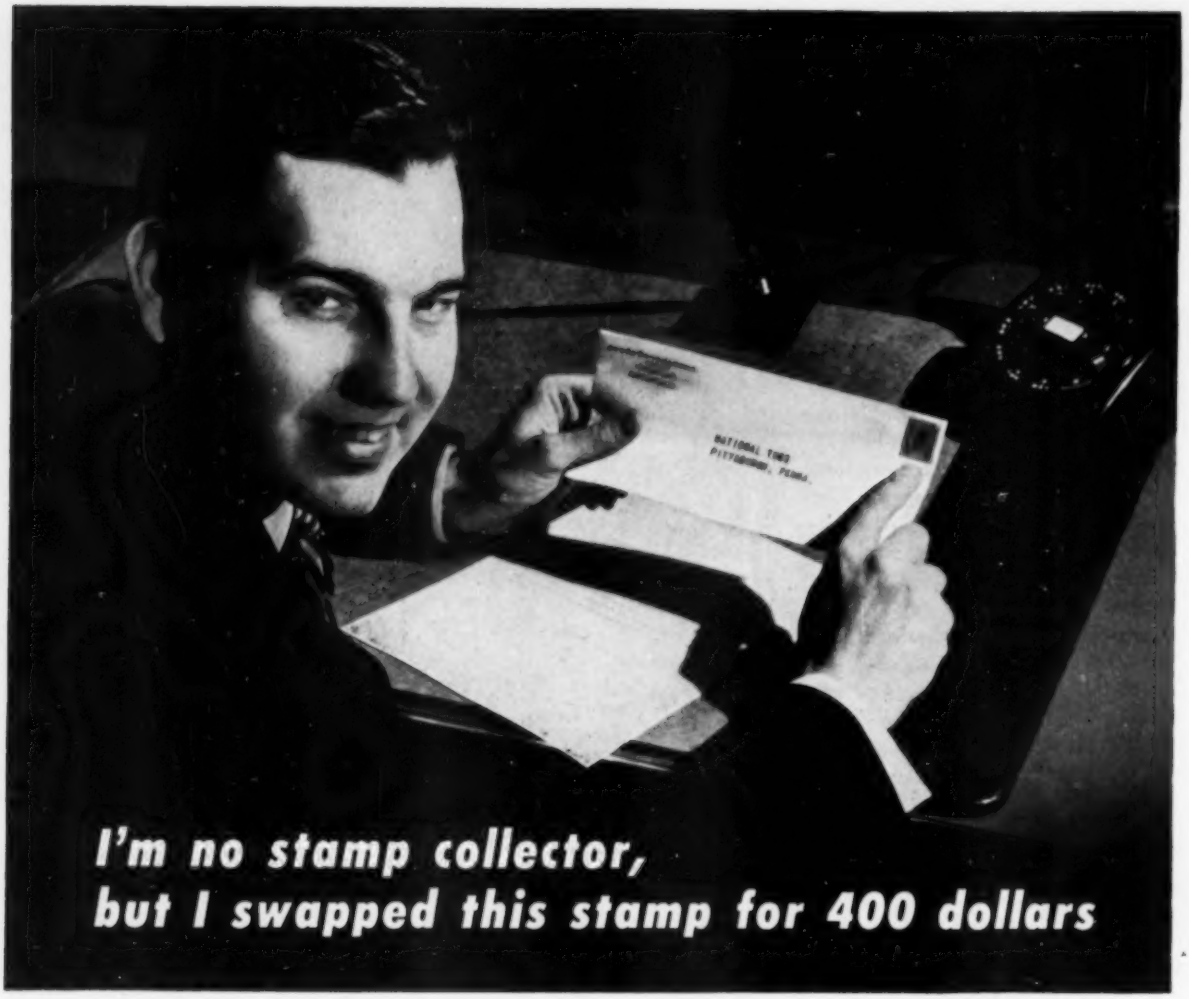
* * *

Our broad experience in the field of industrial elevatoring qualifies us to advise on standard or special adaptations of Otis elevators for unusual freight handling requirements. This experience is available for any size installation, however large—or small. Call any of our 268 offices for details.

Otis Elevator Company
260 11th Ave., New York 1, N. Y.

Otis FREIGHT ELEVATORS

HEAVY DUTY · GENERAL DUTY · LIGHT DUTY



I don't know anything about rare old stamps. The stamp I put on this letter was an ordinary three-center, but it proved to be just as valuable as many a collector's item.

Here's what happened:

We retubed a large section of the plant recently with high pressure steam piping. I worked out a tubing analysis to handle the higher temperatures and pressures we planned to use; a good safe analysis—high alloy steel in a heavyweight seamless grade.

However, before I ordered the pipe, I thought I'd take advantage of National Tube's free advisory service, so I wrote a letter asking for *their* tubing recommendation. That's when I swapped my three-cent stamp for 400 dollars.

National Tube's recommendation turned out to be a less expensive tubing, yet it was the *exact* analysis for the job. My analysis was a little too good—really more than the installation warranted. When the costs were figured, the National Tube recommendation was 400 dollars less than mine—a direct savings for our plant. The advice had cost me just three cents. Not a bad investment, was it?

When you are in the market for pipe and tubing, call or write National Tube. You'll get the right analysis for the job, every time—at the lowest cost to you.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

NATIONAL *Seamless* PIPE AND TUBES

UNITED STATES STEEL

MEMO

POWELL has a complete line of steel valves for power plants!

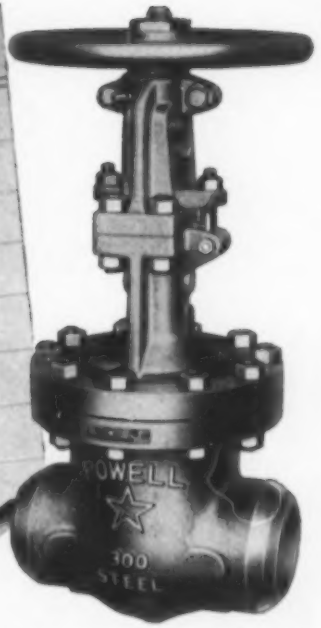


Fig. 3003-WE—CAST STEEL GATE VALVE for 300 pounds W.S.P. Bolted flanged bonnet with outside screw, rising stem and yoke. Sizes 1" to 24", inclusive.

Shown here are just a few Powell Steel Valves for power plants. Whichever type you choose, you can be certain of *dependable* flow control.

Investigate the complete Powell line—valves that have a proven record of long life and dependable service.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our complete line, and help solve any flow control problem you may have. Write The William Powell Company, Cincinnati 22, Ohio.

Fig. 1314-A—CAST STEEL INTEGRAL BONNET "Y" valve for 1500 pounds W.S.P. Also available for 2500 pounds. One-piece construction eliminates body-bonnet joint and possibility of leakage. Sizes ½" to 2", inclusive, with socket weld ends.

Fig. 11365—CAST STEEL PRESSURE SEAL HORIZONTAL LIFT CHECK VALVE for 1500 pounds W.S.P. Piston guided disc. Also available for 600, 900 and 2500 pounds.

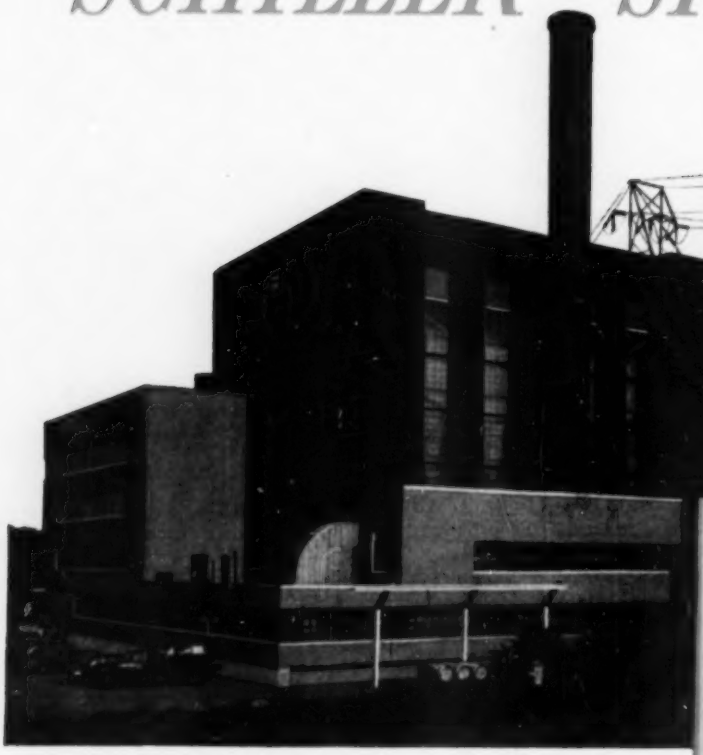
Fig. 11303—CAST STEEL PRESSURE SEAL O.S.&Y. GATE VALVE for 1500 pounds W.S.P. Body-bonnet joint stays tight—internal pressure MAKES rather than breaks the seal. Valves of this design are also available for 600, 900 and 2500 pounds.

CONTROLS FOR THE LIFE LINES OF INDUSTRY

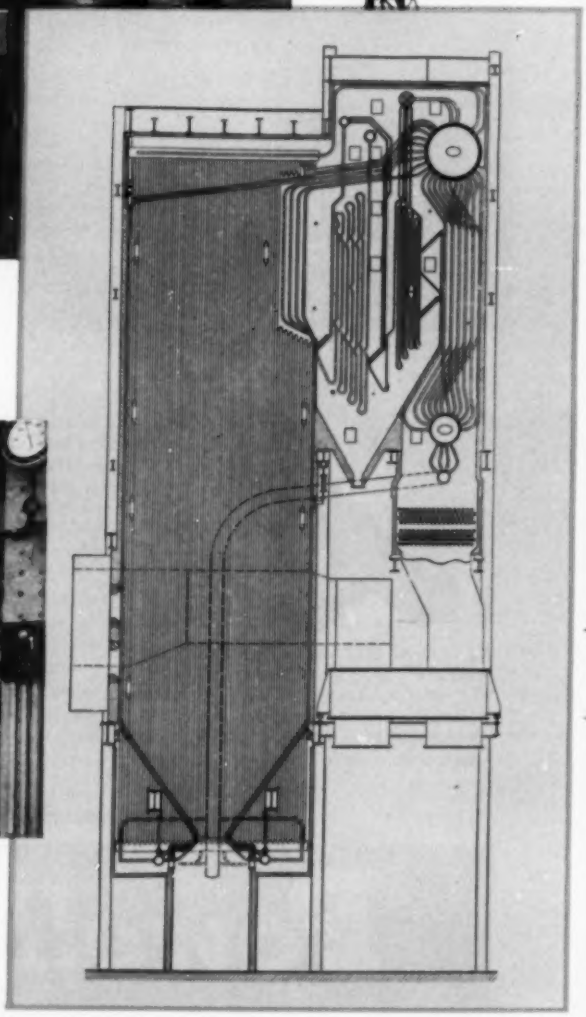
Powell Valves *108th year*

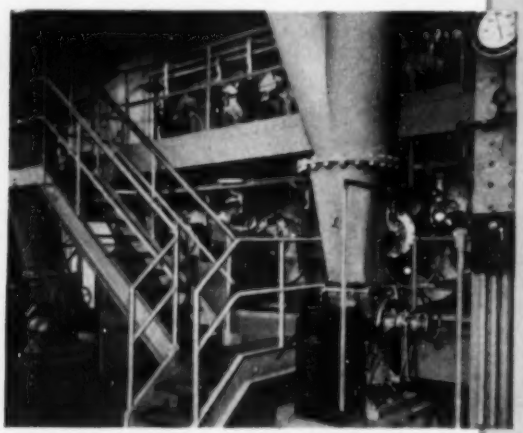
SCHILLER STATION

helps meet rising



Looking east toward Schiller Station and the Piscataqua River. Addition housing FW steam generator now being erected on the right of the present structure. Consulting Engineers: Jackson & Moreland, Boston, Mass.



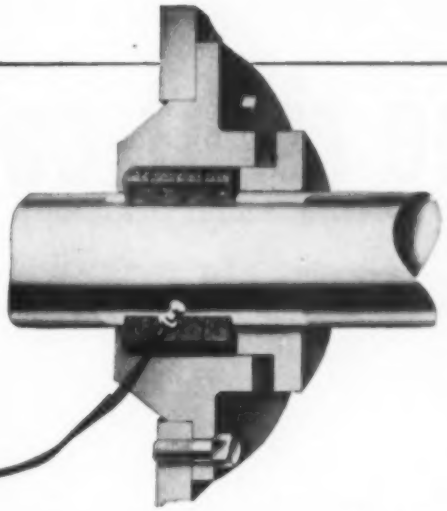


View showing oil burners serving Foster Wheeler boiler. Fuel consumption 65 gallons of oil per minute.

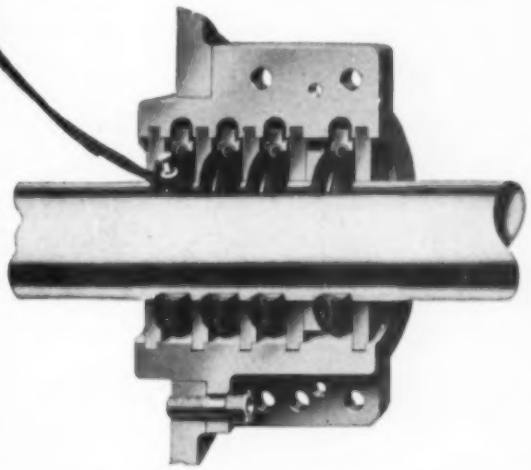
Cross-section of one of two identical Foster Wheeler 2-drum steam generators at Schiller Station, Portsmouth, N. H. Design pressure 1475 psig; final steam temperature 950F peak capacity 450,000 lbs per hr.

COPPUS TURBINES

offer you a choice of packing rings



STANDARD METALLIC RING PACKING — Made of high grade asbestos cores encased in specially treated lubricated aluminum foil. Recommended as a low-friction, long-service packing for steam temperatures up to 850 F and back pressures up to 50 lb. Adjustable packing glands keep leakage at minimum. Easy access to packing rings.



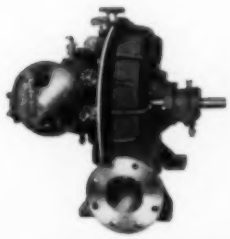
OPTIONAL CARBON RING PACKING — Consists of three carbon packing rings on the pressure side and one beyond the leak-off section. Each ring has three segments held together by a stainless steel garter spring. For back pressures up to 75 lb. Standard for vacuum or gas operation, or when leak-off is desired.

Heavy chrome plating on shaft at stuffing box is common to both types of Coppus packing.

Coppus Turbines ranging from 150 hp down to fractional in 6 frame sizes

FIT TURBINE COSTS TO HORSEPOWER NEEDS

When you buy turbines rated close to your exact horsepower needs, you save plenty of money. That's because turbines are generally priced in proportion to their size. The wide range of sizes of Coppus Turbines promises purchasing economy for you from the 150 hp size down to the smallest. As for operating and maintenance economies, you get them, too, from such other features as: greater number of manually operated valves for individual control of steam nozzles; replaceable cartridge-type bearing housings and others. For complete details . . .

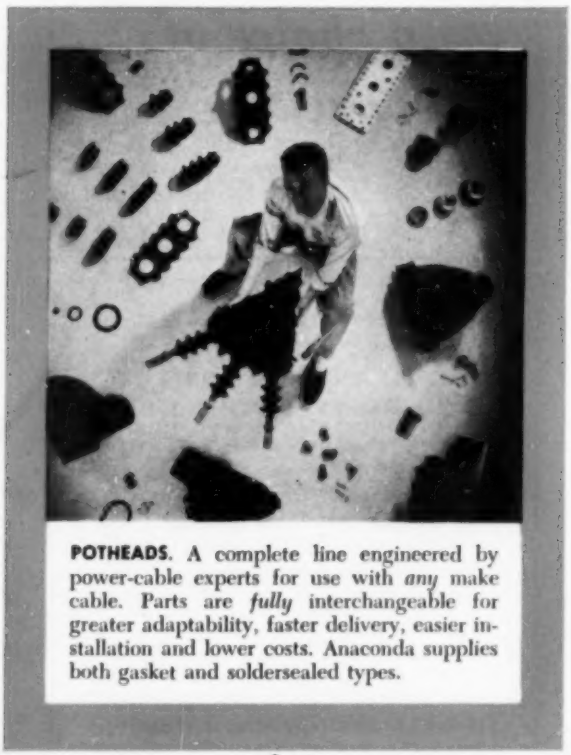


WRITE FOR BULLETIN 135
COPPUS ENGINEERING CORPORATION
252 Park Avenue
Worcester 2, Mass.
Sales offices in THOMAS' REGISTER

COPPUS "BLUE RIBBON" TURBINES

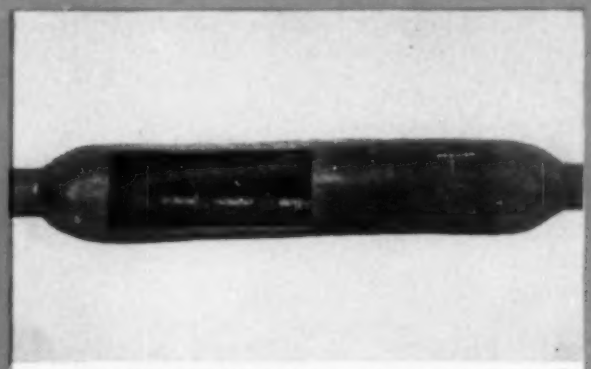
This New Anaconda Catalog Puts

The right cable accessory



POTHEADS. A complete line engineered by power-cable experts for use with *any* make cable. Parts are *fully* interchangeable for greater adaptability, faster delivery, easier installation and lower costs. Anaconda supplies both gasket and soldersealed types.

...at your finger tips



F-3* ALLOY-LEAD JOINT SLEEVE. F-3 has higher tensile strength, lower creep rate, greater bursting strength, and higher resistance to bending fatigue and vibration. Furnished with jointing kit when specified.

*Reg. U. S. Pat. Off.

JOINTING KIT. Your cable-installation crews have everything needed new and clean for a specific joint. Materials are always on the spot. Never forgotten. Never left behind. Kits assure neat, lasting job.

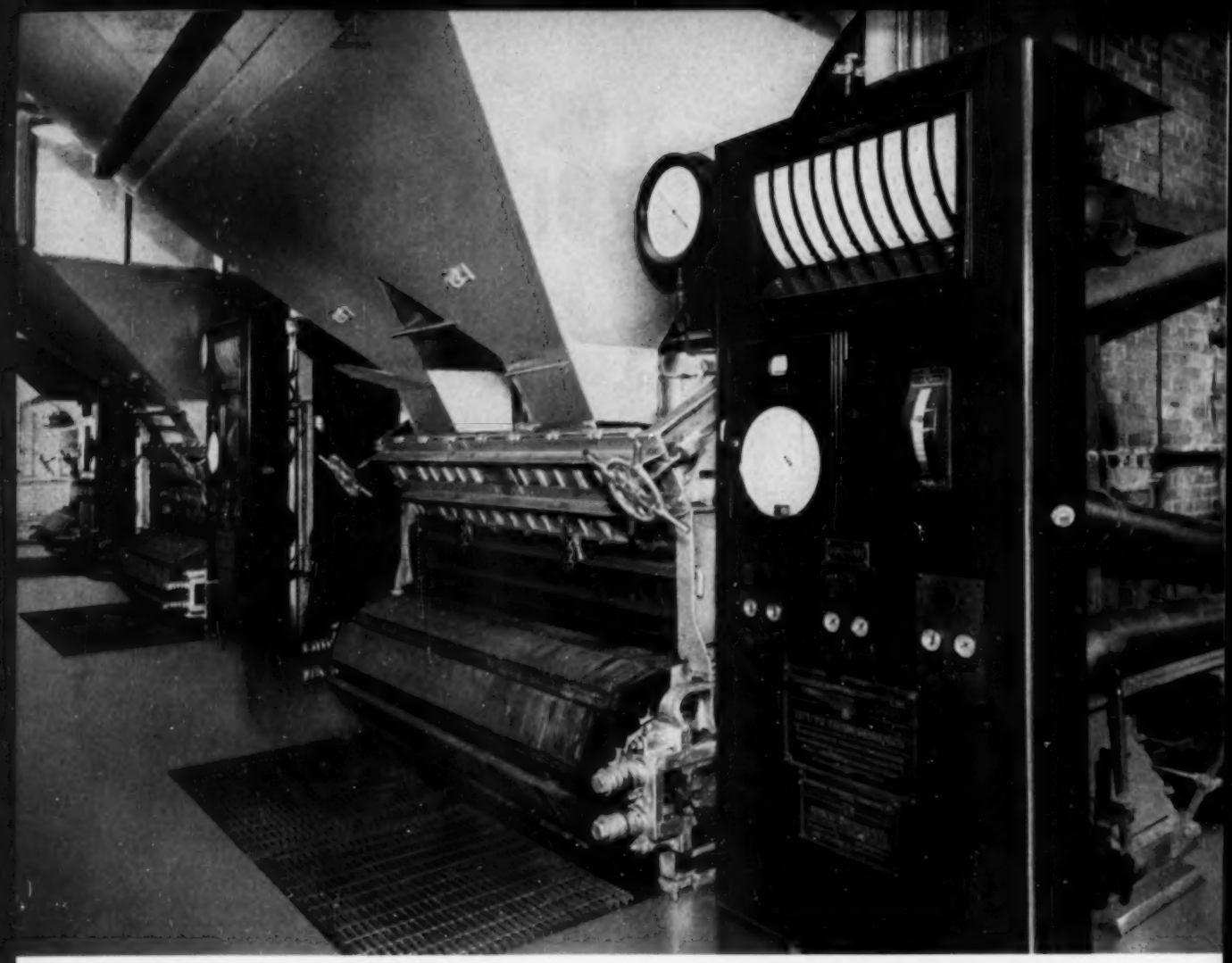
FILLING COMPOUNDS. A group of compounds both plastic and fluid to meet every need: for paper-, varnished-cambric and rubber insulated cable joints and potheads for voltages up to and including 69kv.

Free —

Cable Accessories Catalog No. C-79-13-14. The most comprehensive book on cable accessories ever published. Simplifies selection and ordering of the right item for every job. A copy is yours for the asking. Write *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

ANACONDA®

where cable accessories are made by cable experts



Pennsylvania R. R. saves $33,000 a year by burning coal the modern way

The Lafayette Street Power Plant of the Pennsylvania Railroad in Fort Wayne, Indiana, heats a passenger station, office buildings and repair shops. In addition, it also supplies steam for power, processing and car heating. To increase the efficiency of this coal-fired plant, the railroad replaced its old boilers with modern steam generating equipment, regulated by automatic combustion controls. At the same time, they modernized the ash removal system.

Today the cost of steam generation has been lowered from 77c to 59c per 1,000 pounds and combustion efficiency raised 25% higher than before. Overall heating costs have been cut $33,000 yearly.

Investigate Your Fuel Costs

If you're planning to modernize your plant or build a new one – or if you are just interested in cutting fuel costs—find out how coal, burned the modern way, compares to other fuels. Talk to a consulting engineer or your nearest coal distributor. Their advice may save you thousands of dollars every year.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available.

Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar.

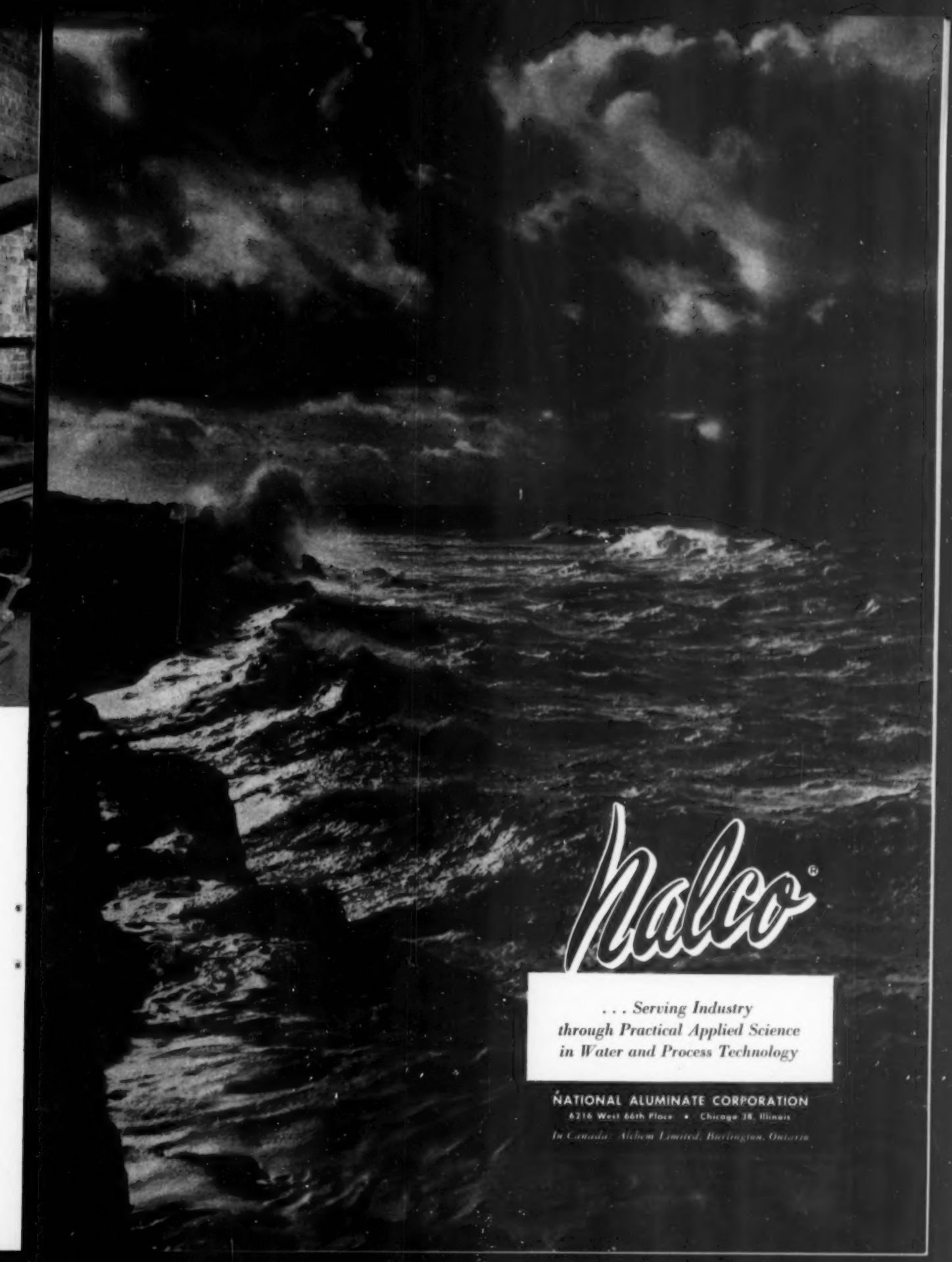
Automatic coal and ash handling systems can cut your labor cost to a minimum.

Coal is the safest fuel to store and use. No dust or smoke problems when coal is burned with modern equipment.

Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

BITUMINOUS COAL INSTITUTE
A department of National Coal Association
Southern Building, Washington 5, D.C.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through Practical Applied Science
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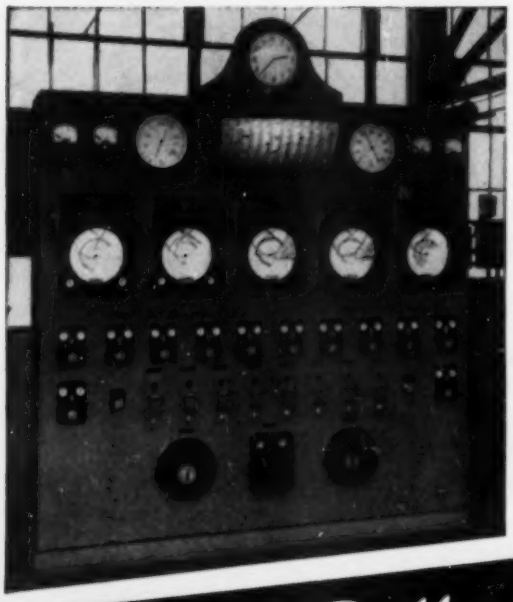


This Bailey Boiler Control Panel in a mid-western industrial plant saves fuel and insures safe operation of a 100,000 lb per hr, 175 psi, sat., pulverized coal and gas-fired boiler.

What's Your Control-Dollar Efficiency?

Control-dollars frequently bring annual investment returns of 100% or more. When you buy adequate, well-applied steam plant controls, you increase your dollars' ability to work usefully for you.

That's where Bailey can help: Bailey Controls can give you a better control-dollar efficiency. Here's why:

1. **Complete Range of Equipment—fully co-ordinated.** You need never worry that a Bailey Engineer's recommendation is slanted in favor of a particular type of equipment, just because he has a limited line to sell—or that Bailey will pass the buck for efficient control; we offer *complete* boiler control systems.

2. **Engineering Service—backed by experience.** No other manufacturer of instruments and controls can offer as broad an experience, based on successful installations involving all types of combustion, flow measurement and automatic control.

3. **Direct Sales-Service—conveniently located near you.** Bailey Meter Company's sales-service engineers are located in more industrial centers than those of any other manufacturer of boiler control systems; you get prompt, experienced service with a minimum of travel time and expense.

•

For better control-dollar efficiency—for more power per fuel dollar, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're proud to stand on our record: "More power to you!"

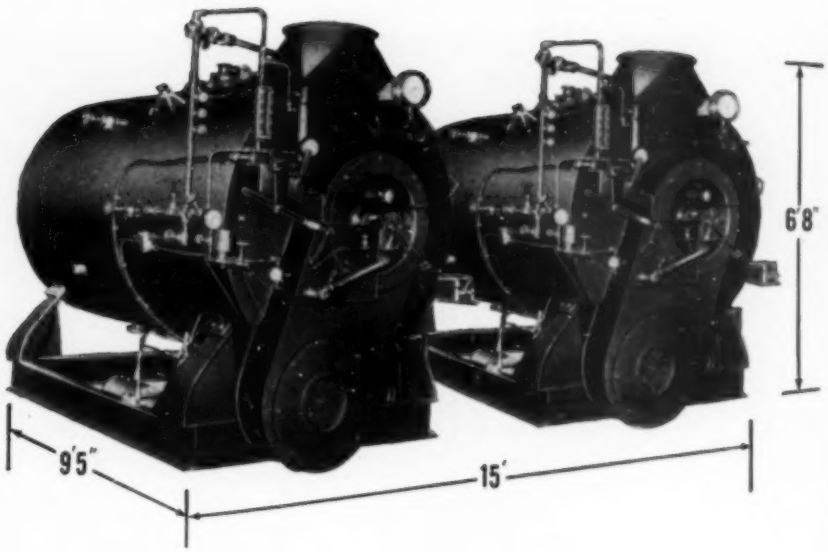
A-112-1

BAILEY METER COMPANY

1028 IVANHOE ROAD
CLEVELAND 10, OHIO

Controls for Steam Plants
COMBUSTION · FEED WATER
TEMPERATURE · PRESSURE
LIQUID LEVEL · FEED PUMPS

9600 lbs. of Steam in only 1000 cu. ft!



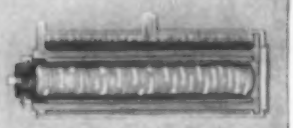
Using only 140 sq. ft. of Floor Space

The Cyclotherm MC4000 Steam Generator allows you to utilize your space more efficiently . . . to devote more of your area to storage and production use.

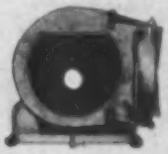
Requires the minimum in boiler room space and costs. Or can be placed in a working area because radiant heat loss is at a minimum. Exclusive, patented, Cyclotherm Cyclonic Combustion makes the most compact steam-generator yet developed possible.

A flaming cyclone swirls the length of the firetube . . . separated from the walls only by a thin layer of air. The even distribution of the flame converts the entire surface of the firetube into an effective heating area. Without increasing the boiler size, the heating area has been enlarged to the maximum.

No other method of combustion can equal this accomplishment. The Cyclotherm MC4000 is ideally suited for service wherever steam is needed but boiler room space is at a premium.



Exclusive, patented Cyclonic Combustion gives you a minimum guaranteed 80% efficiency in only 2 passes . . . a rate unequalled by any other method of combustion.



Simplified design shaves maintenance costs up to 30%. Cleaning and replacement of parts can be done in minutes by any maintenance man. Firetube never needs cleaning as all fuel is consumed.

Automatically operates by electronic control system. No fireman required. Burns gas and/or oil. A Cyclotherm unit will pay for itself in 4½ years in fuel savings alone.

Precision modulation equipment regulates firing rate from 30 to 100% of the Cyclotherm's capacity without losing peak efficiency.

Now aboard Sinclair Refining Co.'s "Sinclair Chicago," and U. S. Navy's "U. S. S. Endurance" . . . operating efficiently in space too cramped for ordinary packaged units.

Other Cyclotherm models range from 18 to 500 hp . . . from 15 to 200 psi. For industrial, commercial plants, institutions and marine use.

YEARS AHEAD IN STEAM GENERATION

CYCLOTHERM®

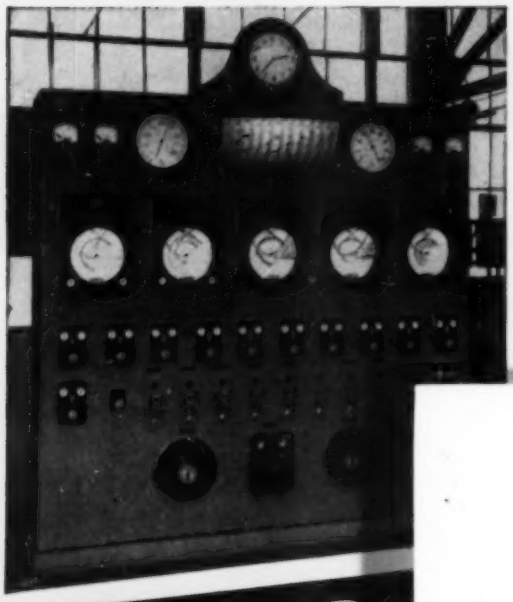
STEAM AND HOT WATER GENERATORS

See Cyclotherm's new MC4000 Steam Generator at the

CYCLOTHERM EXHIBIT

Booth 450, 21st Power Exposition, Philadelphia, Dec. 2-7

Cyclotherm Division, U. S. Radiator Corp., Dept. 334, Oswego, New York



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Control-Dol

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That's where Bailey can help: Bailey
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3. Direct Sales-Service — conveniently located near you. Bailey Meter Company's sales-service engineers are located in more

Engineer to arrange a visit to a nearby Bailey installation. We're proud to stand on our record: "More power to you!"

A-112-1

BAILEY METERS

BAILEY METER COMPANY

1028 IVANHOE ROAD
CLEVELAND 10, OHIO

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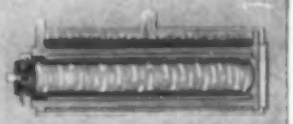
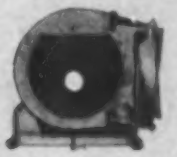
COMBUSTION · FEED WATER
TEMPERATURE · PRESSURE
LIQUID LEVEL · FEED PUMPS

9600 lbs. of Steam in only 1000 cu. ft!



Exclusive, patented Cyclonic Combustion gives you a minimum guaranteed 80% efficiency in only 2 passes . . . a rate unequalled by any other method of combustion.



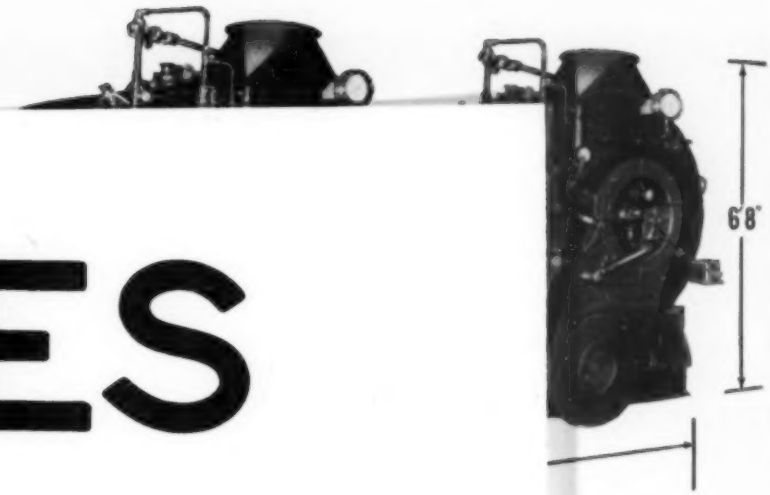
Simplified design shaves maintenance costs up to 50%. Cleaning and replacement of parts can be done in minutes by any maintenance man. Firetube never needs cleaning as all fuel is consumed.

Automatically operates by electronic control system. No fireman required. Burns gas and/or oil. A Cyclotherm unit will pay for itself in 4½ years in fuel savings alone.

Precision modulation equipment regulates firing rate from 30 to 100% of the Cyclotherm's capacity without losing peak efficiency.

Now aboard Sinclair Refining Co.'s "Sinclair Chicago," and U. S. Navy's "U. S. S. Endurance" . . . operating efficiently in space too cramped for ordinary packaged units.

Other Cyclotherm models range from 18 to 500 hp . . . from 15 to 200 psi. For industrial, commercial plants, institutions and marine use.



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A flaming cyclone swirls the

No other method of combustion can equal this accomplishment. The Cyclotherm MC4000 is ideally suited for service wherever steam is needed but boiler room space is at a premium.

YEARS AHEAD IN STEAM GENERATION

CYCLOTHERM®

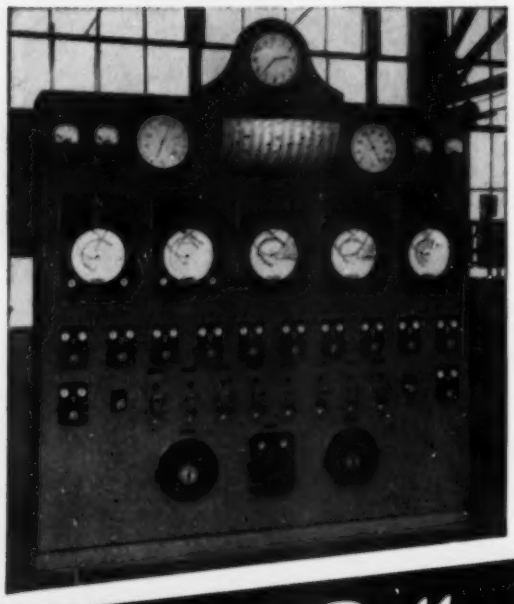
STEAM AND HOT WATER GENERATORS

See Cyclotherm's new MC4000 Steam Generator at the

CYCLOTHERM EXHIBIT

Booth 450, 21st Power Exposition, Philadelphia, Dec. 2-7

Cyclotherm Division, U. S. Radiator Corp., Dept. 334, Oswego, New York



This Bailey Boiler Control Panel in a mid-western industrial plant saves fuel and insures safe operation of a 100,000 lb per hr, 175 psi, sat., pulverized coal and gas-fired boiler.

What's Your Control-Dollar Efficiency?

Control-dollars frequently bring annual investment returns of 100% or more. When you buy adequate, well-applied steam plant controls, you increase your dollars' ability to work usefully for you.

That's where Bailey can help: Bailey Controls can give you a better control-dollar efficiency. Here's why:

1. **Complete Range of Equipment—fully co-ordinated.** You need never worry that a Bailey Engineer's recommendation is slanted in favor of a particular type of equipment, just because he has a limited line to sell—or that Bailey will pass the buck for efficient control; we offer *complete* boiler control systems.

2. **Engineering Service—backed by experience.** No other manufacturer of instruments and controls can offer as broad an experience, based on successful installations involving all types of combustion, flow measurement and automatic control.

3. **Direct Sales-Service — conveniently located near you.** Bailey Meter Company's sales-service engineers are located in more industrial centers than those of any other manufacturer of boiler control systems; you get prompt, experienced service with a minimum of travel time and expense.

•

For better control-dollar efficiency—for more power per fuel dollar, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're proud to stand on our record: "More power to you!"

A-112-1

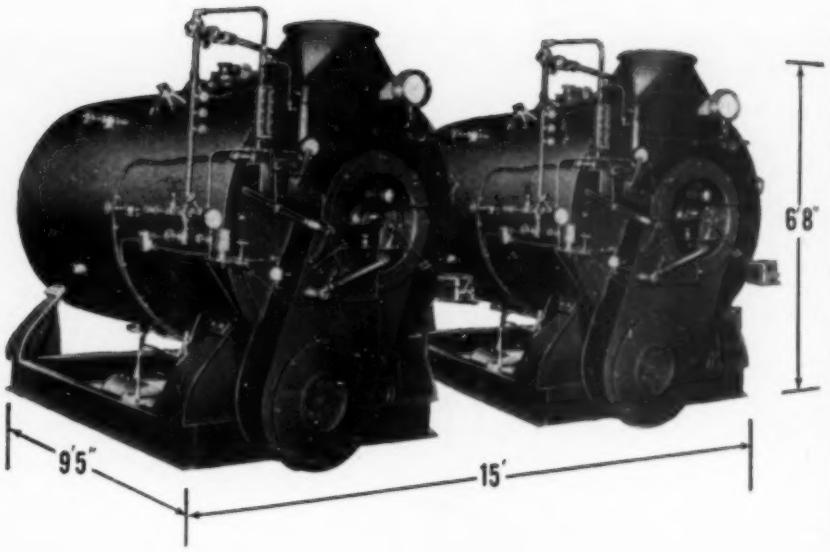
BAILEY METERS

BAILEY METER COMPANY

1028 IVANHOE ROAD
CLEVELAND 10, OHIO

Controls for Steam Plants
COMBUSTION · FEED WATER · TEMPERATURE · PRESSURE · LIQUID LEVEL · FEED PUMPS

9600 lbs. of Steam in only 1000 cu. ft!



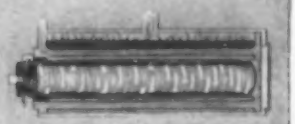
Using only 140 sq. ft. of Floor Space

The Cyclotherm MC4000 Steam Generator allows you to utilize your space more efficiently . . . to devote more of your area to storage and production use.

Requires the minimum in boiler room space and costs. Or can be placed in a working area because radiant heat loss is at a minimum. Exclusive, patented, Cyclotherm Cyclonic Combustion makes the most compact steam generator yet developed possible.

A flaming cyclone swirls the length of the firetube . . . separated from the walls only by a thin layer of air. The even distribution of the flame converts the entire surface of the firetube into an effective heating area. Without increasing the boiler size, the heating area has been enlarged to the maximum.

No other method of combustion can equal this accomplishment. The Cyclotherm MC4000 is ideally suited for service wherever steam is needed but boiler room space is at a premium.



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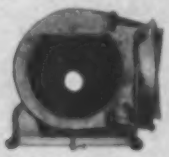

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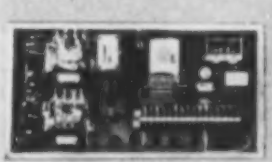

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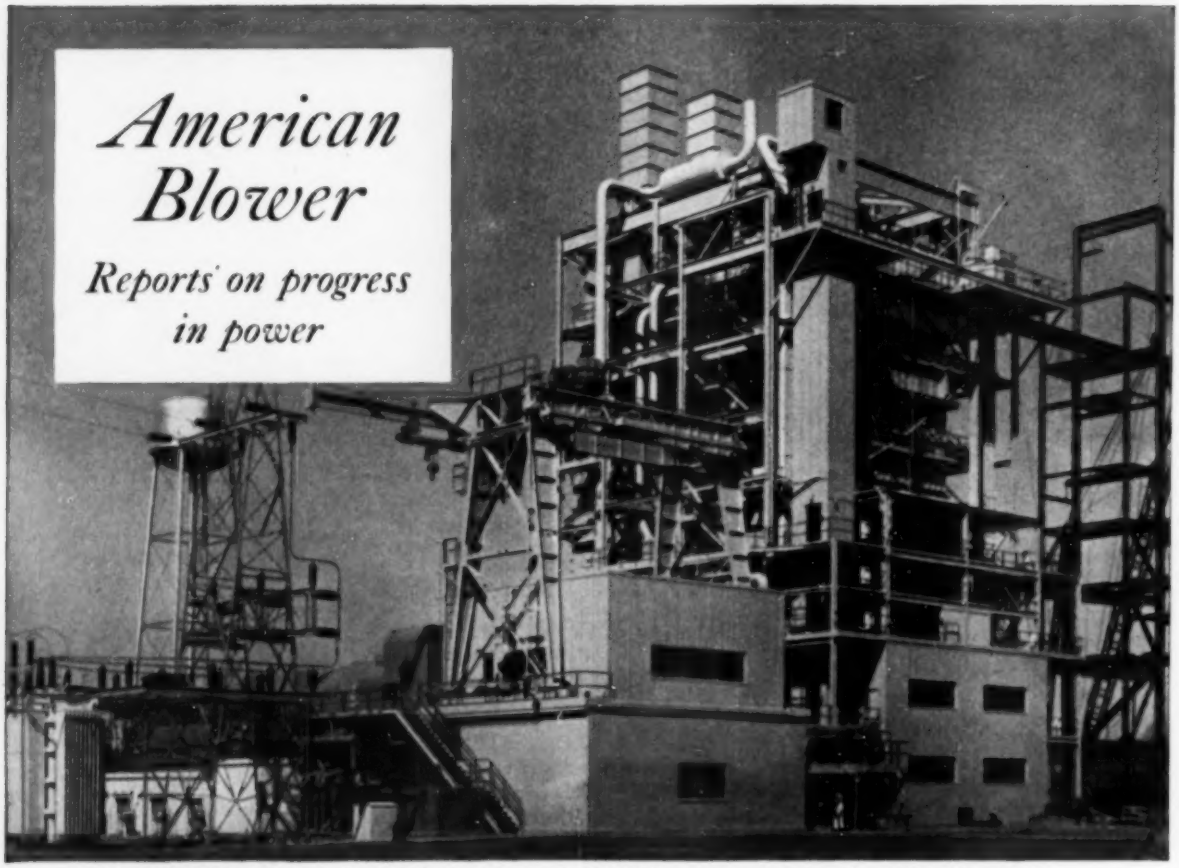
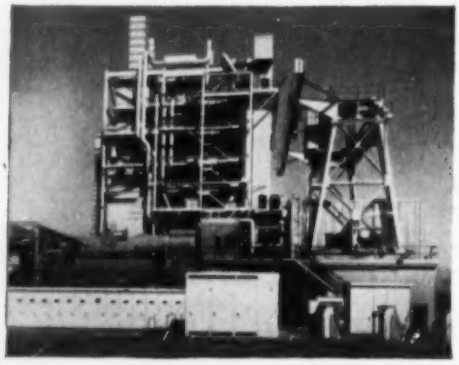
Dallas Power & Light Co. Sirocco Fans for Parkdale



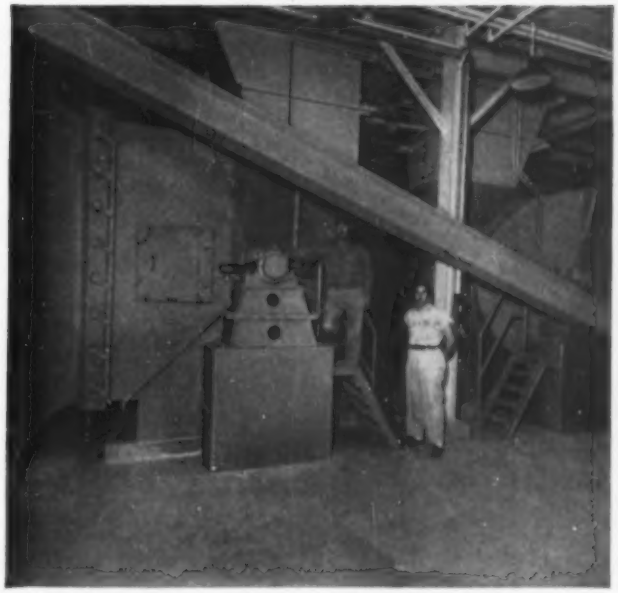
DP&L's No. 1 unit at Parkdale Plant has 87,000 kw generating capacity. The No. 2 unit, now under construction (far right) will add an additional 115,000 kw of capacity.



DP&L expansion program will increase capacity 48 per cent in two years

Two 115,000 kilowatt generating units under construction at Dallas Power & Light Company plants would have served all of metropolitan Dallas' electrical needs as late as 1949. One of the two new units is shown at left at Parkdale Plant, and the other is being built at DP&L's Mountain Creek Plant. Together, the new generators will increase the company's capability 48 per cent by the end of 1956. They will help meet peak demands on DP&L's system which have risen at an average rate of 17 per cent each year since 1946.

chooses Plant



Two American Blower Forced Draft Fans are in operation at the Parkdale Plant. Capacity of each is 123,500 cfm at 100° F at 29" sp. Each fan is driven by an 800-hp motor.

PARKDALE PLANT, newest of Dallas Power & Light Company's generating stations, is the Company's first station to use a pressure furnace. For its initial unit and for Unit No. 2, which is scheduled for completion early in 1955, Dallas Power & Light Company selected American Blower Sirocco Forced Draft Fans.

American Blower Sirocco Fans have long been favorites with progressive power plant operators throughout the United States and Canada. And for good reasons! Sirocco Fans are extremely quiet in operation; they are dependable; and they are economical to run.

In addition to Mechanical Draft Fans for both forced and induced draft, American Blower manufactures Fly Ash Precipitators, Heavy-duty Steam Coils and Gyrol Fluid Drives, for smooth adjustable speed control of fans and boiler feed pumps.

If you have an air handling problem, or plan to expand or modernize your facilities, let American Blower's wide experience work for you. Contact your nearest American Blower Branch Office or write us direct.

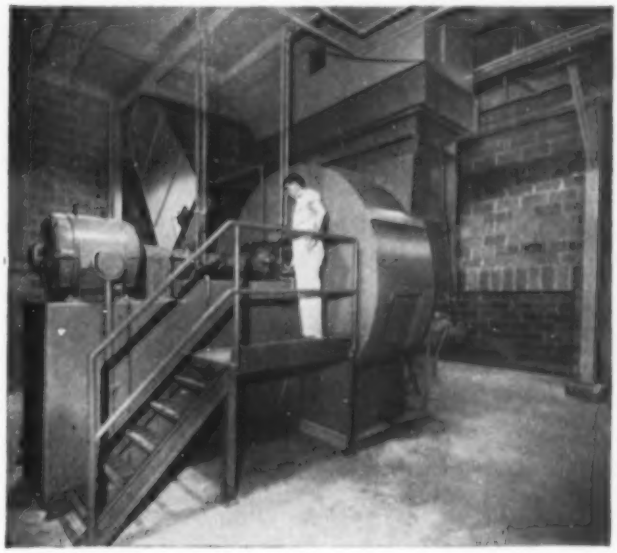


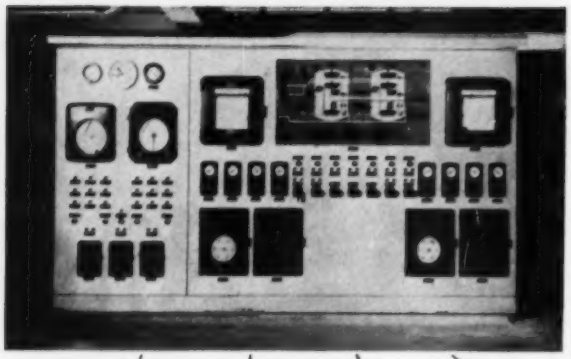
Photo shows an American Blower Recirculating Gas Fan in operation at the Parkdale Plant. Driven by a 100-hp motor, it is rated at 54,000 cfm at 775° F at 6.6" sp.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN • CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary Corporation

AMERICAN BLOWER

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS



10,000,000 ohm-cm.

10,000,000 ohm-cm.

10,000,000 ohm-cm.

10,000,000 ohm-cm.

10,000,000 ohm-cm.

10,000,000 ohm-cm.

10,000,000 ohm-cm.

NOW...10,000,000 ohm-cm. water!

at 160 gpm for 2050 psig boilers...by Demineralization

Just a few years ago, producing large quantities of water of a purity of 0.01 ppm was quite a chore. A tedious, drawn out multiple distillation technique was required. Engineers "dreamed" of producing this water at large flow rates for high pressure boilers and power plants by an easier and more economical method.

Today, at the Pennsylvania Electric Company, Shawville Station, this has become a reality. Makeup for 2050 psig boilers is produced at a rate of up to 160 gpm and with a purity of 10,000,000 Ohm-cm (0.01 ppm) and **less than 0.02 ppm silica** by a fully automatic Graver Mixed-Bed Demineralizer with in-built dependability.

Write for new Demineralizing Bulletin.

GRAVER

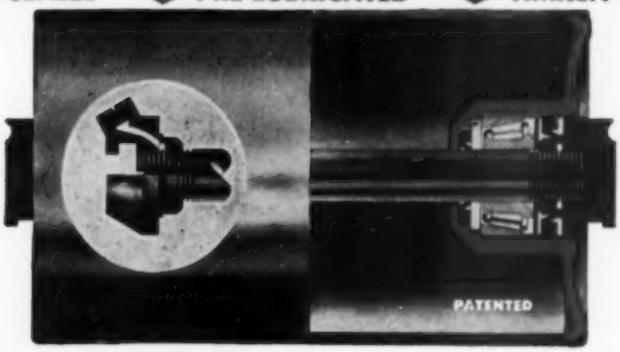
GRAVER WATER CONDITIONING CO.

A Division of Graver Tank & Mfg. Co., Inc.

216 West 14th Street, New York 11, N.Y.

You Need... CONTINENTAL'S UST Idlers

CGC UNIT-SEALED CGC PRE-LUBRICATED CGC TIMKEN BEARINGS



Saves Grease!
Saves Labor!
Saves Belts!
Long Life- THE ULTIMATE IN MINIMUM MAINTENANCE

Continental's Unit-Sealed "UST" Conveyor Idlers, incorporating Timken Bearings, Garlock Klozures, are the answer to the operator's prayer.

The Unit Bearing Assemblies—"sealed unto themselves" provide an ample but not excessive grease reservoir. This represents a saving of grease and further eliminates any possible migration of the grease from upper to lower bearings on inclined rolls. The lubricant is a top quality water repellant grease of a stable consistency with a wide temperature range for long life.

Most important—this construction permits operating the Continental "UST" Idler for extended periods of time without relubrication for 1-2-3 years or longer depending upon the severity or character of conditions.

For detailed information on these idlers write for Bulletin R.P.-116

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA
ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • KNOXVILLE CGC MANUFACTURERS
NEW YORK CITY

Powerful proof!

PLENTIFUL ELECTRIC POWER is the lifeblood of industry today. To help provide ample power for continuing industrial growth in the modern Southland, many new coal-burning power plants were completed in the latter part of 1953 along the lines of the Southern Railway System. Still others are now under way or planned for the immediate future.

These new or enlarged power plants alone will consume a total of more than 13 million tons of coal annually. This is only one million tons less than *all* the coal we handled in 1953—and more than three times the total coal tonnage originating on the Southern in that year.

More coal to make *more* power to feed *more* industry! *Power*ful proof that big things are happening in the South today.

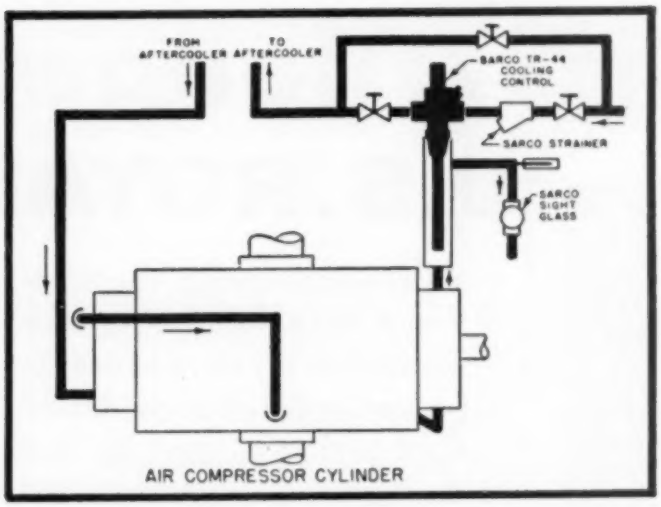
"Look Ahead—Look South!"

Harry A. DeButts
President

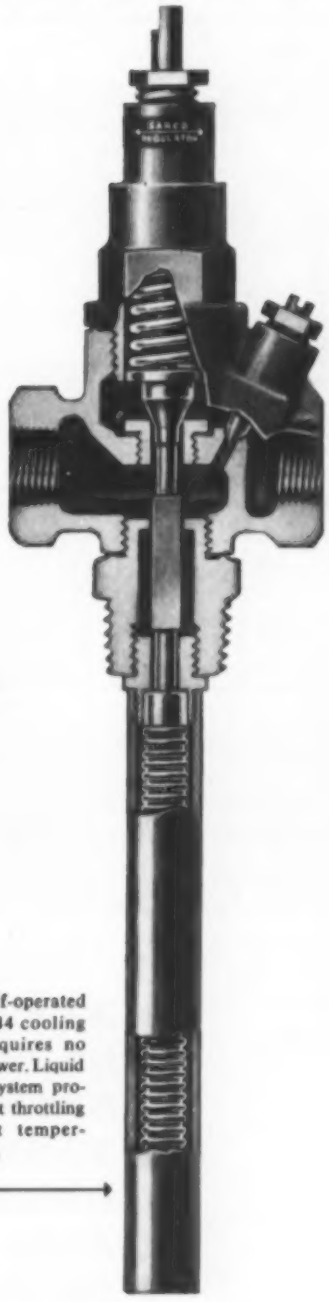
LOOK SOUTH
LOOK AHEAD

SOUTHERN
RAILWAY SYSTEM
WASHINGTON, D. C.

The Southern Serves the South



Sarco Cooling Control guards against dangerous over and under cooling.



Compressors

work better, last longer, cost less to run

with SARCO

COOLING CONTROLS

YOU have to keep your eye on a lot of things to get top efficiency from compressed air systems – and one of the most important is *cooling*.

For example, overcooling – usually a result of manual control – causes condensation on cylinder walls which destroys lubricant and increases wear. In addition, it wastes water.

If you're undercooling, you're cutting down on compressor capacity – and you're taking chances of damaging cylinders, pistons, valves and seats.

It's a lot easier – and also safer and more economical – to let dependable Sarco self-operated temperature controls take over. They insure optimum cooling effect with minimum water consumption regardless of load variation, changes in pressure and temperature of water supply. *You get protection for compressors with maximum efficiency at minimum cost.*

Send for Bulletin No. 520-A "Is Your Air Compressor Capacity Effective?" Sarco Company, Inc., Empire State Building, New York 1, N. Y. Representatives in principal cities.

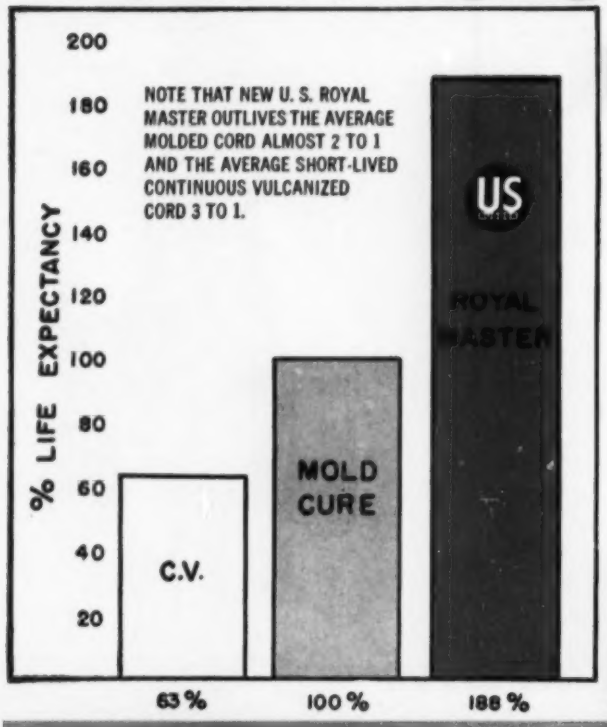
Simple, self-operated Sarco TR-44 cooling control requires no auxiliary power. Liquid expansion system provides perfect throttling throughout temperature range.

SARCO

COOLING CONTROLS • DRAIN TRAPS • STRAINERS
THERMOSTATS • PRESSURE SWITCHES

Now...88% longer

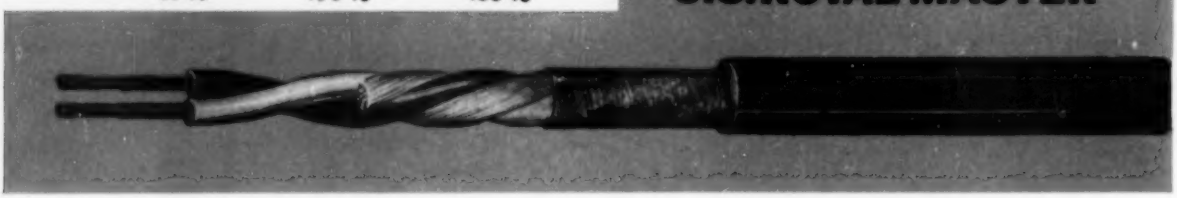
U.S. ROYAL



Chart—summarizing individual service factors weighted by their contribution to overall service life—shows new U. S. Royal Master Cord gives 88% longer life than the average of competitive molded cords.

LOOK FOR THE NAME—

U.S. ROYAL MASTER



Superior on every count!*

- 33.3% greater heat resistance
- 55.7% greater impact strength
- 53.8% greater abrasion resistance
- 30.6% greater resistance to cutting
- 110.3% greater resistance to tearing
- 21.2% greater tension or breaking strength
- 23.3% greater oil resistance
- 128.8% greater flexibility

*to the average of molded cords of other makes

US RUBBER

UNITED STATES

ELECTRICAL WIRE AND CABLE DEPARTMENT

cord life—with NEW MASTER portable cord!

Far outlasts *any* other cord made!

Service to cost ratings show new U. S. Royal Master Cord actually gives $1.88 in value for every cord dollar when compared to the average competitive molded cord!

Two years ago, "U. S." engineers began a *complete reexamination* of portable cord construction, service life, and the causes of cord failure.

Over 10,000 tests were made. More than a thousand cords of all leading makes, including our own famous U. S. Royal Cord, were analyzed, tested, and compared.

Every life factor was considered and carefully evaluated, alone and in its relation to overall cord performance and service life.

Backed by 64 years of experience in the manufacture of electrical wire and cable, U. S. Rubber engineers then translated their findings into an entirely new portable cord, designed to surpass any other previously made.

Extensive tests, both in the laboratory and in outside plant installations have proved this new portable cord startlingly superior in every respect!

New U. S. Royal Master is unquestionably the finest cord you can buy!

From every standpoint, new U. S. Royal Master is a finer, more durable cord—actually gives 88% longer life than the average of other molded cords—far longer than *any* other cord—surpassing even a *hypothetical* cord incorporating the best features of all those tested!

Far greater value, too! In spite of almost doubled service life, this great new cord is in the same price category as other molded cords—giving you $1.88 in cord value for every cord $1.00!

Prove to yourself the outstanding superiority of new U. S. Royal Master Portable Cord—in both service life *and* economy! Get in touch with your "U. S." distributor today!

Approved by Underwriters' Laboratories, Inc.

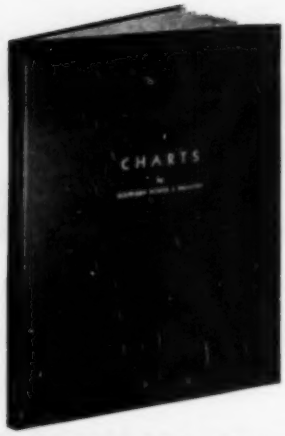
RUBBER COMPANY

ROCKEFELLER CENTER, NEW YORK 20, N. Y.

"CHARTS"

Quick Solutions for Everyday Problems...

Specifically designed by SOUTHERN POWER AND INDUSTRY to serve the needs of Southern engineers, operating officials, department heads and maintenance foremen, "CHARTS" gives quick solutions for everyday problems. And now you can get a three-year subscription to S.P.I. PLUS a copy of "CHARTS" for only $4.00.



Note the wide range of subject matter:

I. PROPERTIES OF AIR, STEAM AND WATER

II. POWER PLANTS

III. AUXILIARY AND MECHANICAL EQUIPMENT

IV. REFRIGERANTS AND REFRIGERATION

V. FLUID FLOW

VI. MATHEMATICS

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SOUTHERN POWER & INDUSTRY, 806 Peachtree St., N.E.
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Enclosed is $4.00.

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"CHARTS" is not for sale separately, but if you have been intending to subscribe to SOUTHERN POWER AND INDUSTRY—or if your present subscription is about to lapse—write today using the coupon at right and take advantage of this outstanding offer.

Our Supply is Limited
So You Must Act Quickly!

R/M's BIG 7 Packing Types meet 95% of all packing needs

TYPE 2

Valves like this one, which handles heat transfer oils in chemical processes at 600°F. under 15 lbs. pressure, give top performance with R/M No. 1326-J, a packing included in Type 2 of R/M's Big 7 Packing Types.

With R/M you can pack more efficiently

This basic line of just seven field-tested packings will lower your maintenance costs, cut your down-time, reduce your inventories, and simplify your ordering. It's a fact. And the reason is that each one of R/M's Big 7 Packing Types has been specially engineered to give you custom-built performance. Standardize on the ones you need (your entire plant probably requires only three or four), and you will find it possible to practice preventive rather than corrective maintenance. Find out all about R/M's Big 7 Packing Types by calling in your R/M distributor.

R/M PACKINGS FOR MAINTENANCE PURPOSES ARE SOLD ONLY THROUGH AUTHORIZED R/M DISTRIBUTORS

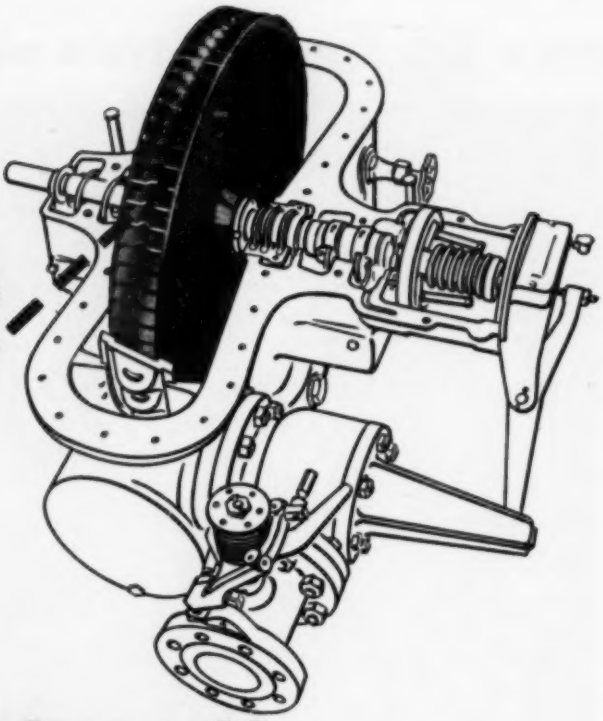
RAYBESTOS-MANHATTAN, INC., PACKING DIVISION, MANHEIM, PA.

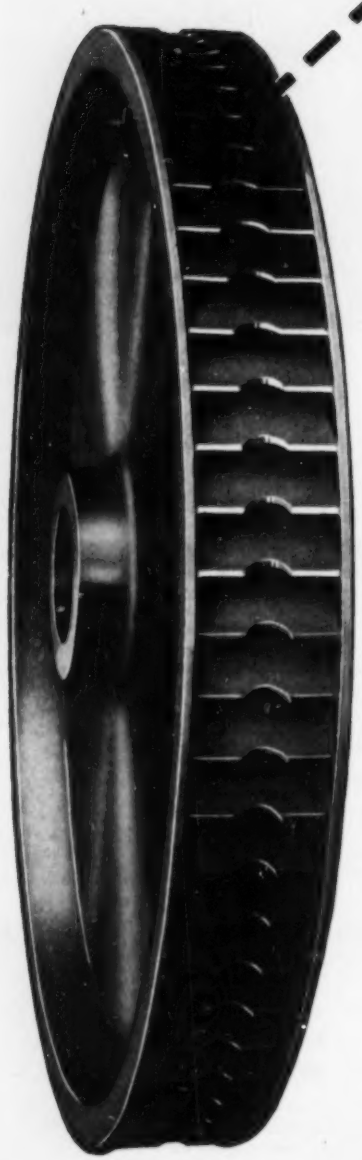
R/M **BIG 7 PACKINGS**

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada.

RAYBESTOS-MANHATTAN, INC., Packings • Asbestos Textiles • Industrial Rubber, Engineered Plastic, and Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Bowling Balls

TERRY SOLID WHEEL





..."trade mark" of a trouble-free turbine

This is the rotor of a Terry solid-wheel turbine. There are a number of reasons why it has become a symbol for reliable, trouble-free operation.

First, because the wheel is a single forging, in which a series of semi-circular buckets is milled, there are no separate parts to become loose or work out.

Second, because the power-producing action of the steam takes place on the curved surfaces at the back of the buckets, blade wear is of little consequence. Wear does not materially affect horsepower or efficiency.

Third, because the steam enters the buckets in a direction at right angles to the shaft, there is no need for close axial blade clearances. The blades cannot foul. There is a one inch clearance on either side of the wheel. In addition, the blades are double rim protected.

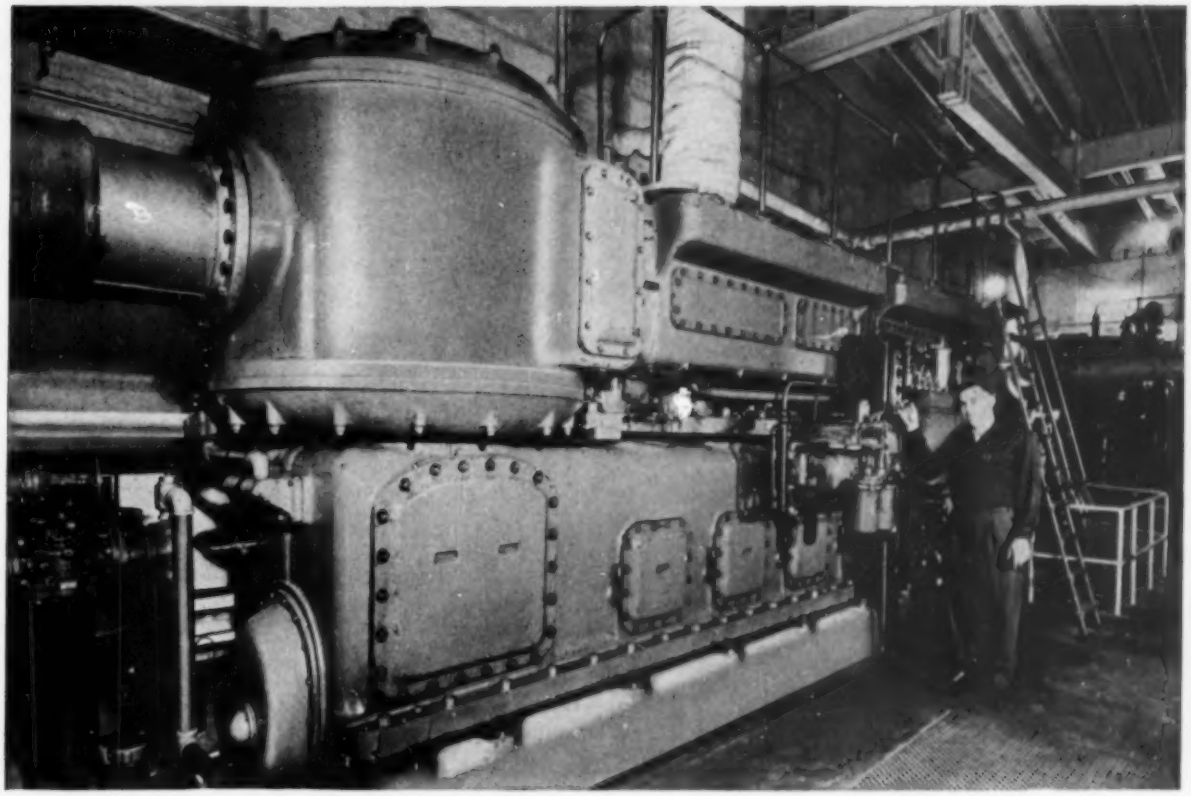
These are only a few of the reasons why the Terry solid wheel has become a "Trade Mark" for trouble-free turbine performance. For complete details, send for a copy of bulletin S-116. No cost or obligation.

THE TERRY STEAM TURBINE CO.
TERRY SQUARE, HARTFORD 1, CONN.

TERRY

TT-1197

"Our tests show Gascon® Oils best!"



. . . says A.E. Harms, CHIEF ENGINEER

YUKON MILL AND GRAIN COMPANY, YUKON, OKLAHOMA

It's *doubly* important that the Yukon Mill and Grain Company's 5 diesels operate with as little trouble as possible. For this plant not only supplies power for the mill, but also for the City of Yukon.

Chief Engineer Harms writes, "When we changed to Sinclair GASCON Oil D-HD, the results were extremely satisfying – wear has been greatly reduced, varnish is gone from pistons and cylinders and stuck rings are a thing of the past. As you might expect, we now use Sinclair exclusively."

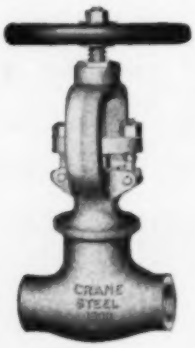
You too, can rely on Sinclair's full line of top quality diesel lubricants. Phone your local Sinclair representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

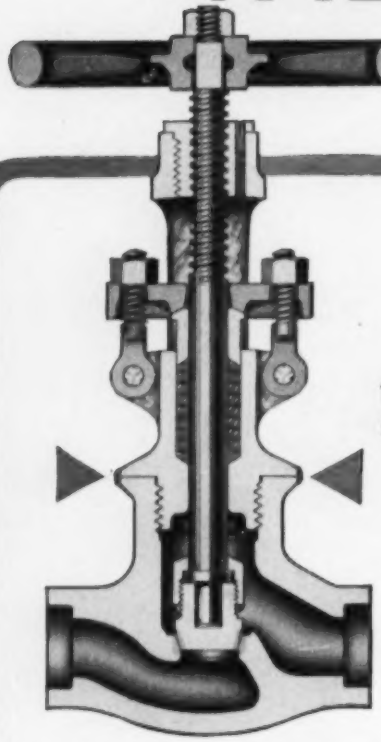
SINCLAIR DIESEL LUBRICANTS

save wear and replacements

newest in small steel valves for high-pressure/high-temperature

CRANE
lip-seal bonnet (patented)
VALVES





Lip Seal design is exceedingly simple. Body and bonnet are screwed together until a firm metal-to-metal contact is made between the smoothly machined flat surface on the shoulder of the bonnet and the top of the body. The small lips around the periphery are then seal welded.

- **Absolute Bonnet-Joint Tightness**
- **Freedom from Bonnet-Joint Maintenance**
- **Minimum Weight and Bulk**
- **Easier Dismantling and Reassembly**

1500 AND 2500-POUND GLOBE AND ANGLE PATTERNS
SOCKET-WELDING AND SCREWED ENDS. SIZES ½ TO 2-INCH

What better way to seal against leakage at the bonnet joint of a small steel valve . . . than with a simple weld. And that's all the weld is ever called upon to do. Extra-long body-bonnet threads carry all mechanical loads—and at comparatively low stresses. Should dismantling be necessary, the seal weld may be repeatedly ground off—and reapplied—without damage to valve.

Right along with this modern Crane sealing principle go other important refinements. You get a compact, weight-saving structure without sacrificing strength or reducing seat area—a more rigid swivel disc-stem connection—durable Stellite-faced plug-type disc—and Stellite-faced integral seat.

Crane Lip-Seal Bonnet Valves are by far your best buy for high-pressure/high-temperature power services . . . worthy companions to the larger Crane Pressure-Seal Valves. Ask your Crane Representative for Circular AD1902, or write direct.

THE BETTER QUALITY... BIGGER VALUE LINE... IN BRASS, STEEL, IRON

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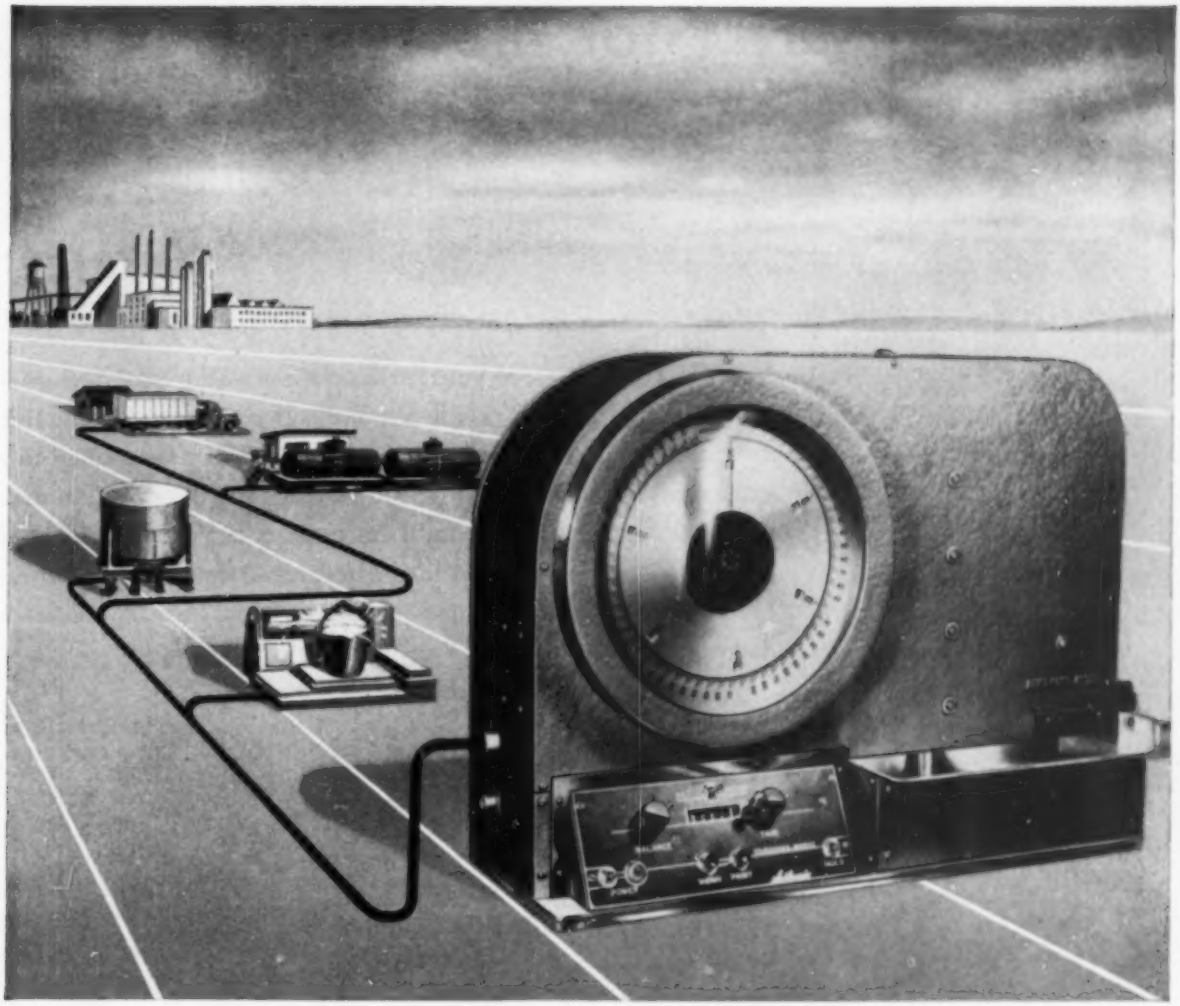

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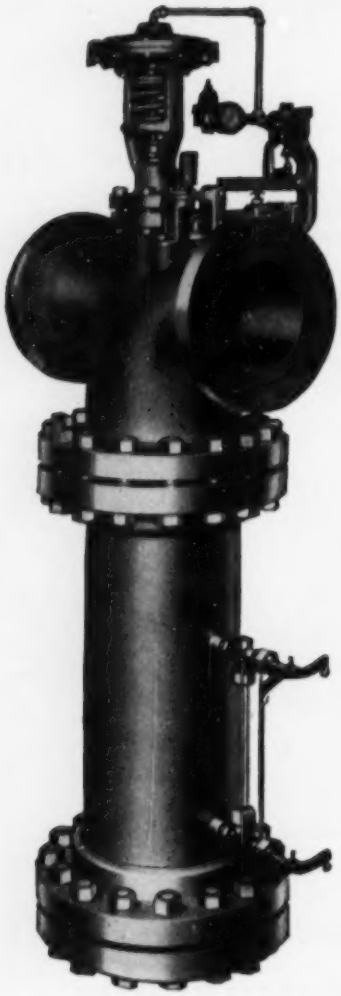
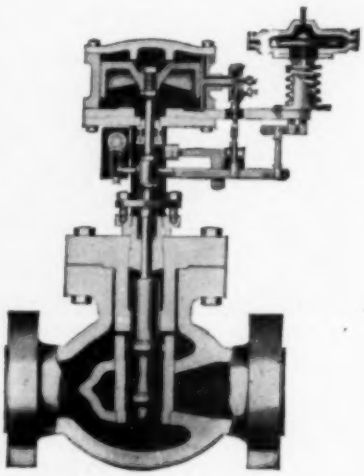


WHEN you select your pressure reducing and desuperheating station, you'll pay more if you buy COPES. But if your job is a tough one, you'll find COPES cheapest in the long run. You'll be money ahead in installation, operation and maintenance costs, and you'll be getting *accurate* control—even down to your lightest loads, not just at your normal flows.

You'll get *quiet* operation—avoiding annoying chatter and destructive vibration.

You'll get 'round-the-clock dependability for years to come—with any adjustments or maintenance easily handled by your plant personnel.

It all adds up to the kind of performance you need for your tough jobs—results you cannot expect if you buy on price.



COPES-VULCAN DIVISION
CONTINENTAL FOUNDRY & MACHINE COMPANY
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The COPES DESUPERHEATER

You'll find it easy to install the self-contained COPES Desuperheater. It goes into the line as a unit, with only three connections. All accessories are furnished. You need no extra steam atomizing valve with extra stop valves—no long run of alloy-steel steam piping—no extra piping from the temperature element to the spray nozzle—no other extras.

You'll also find your COPES Desuperheater correctly sized for low velocities—for minimum noise, vibration and wear. You'll find temperature control accurate—even on lightest flows—because cooling water is controlled and completely atomized inside the mixing chamber. Adjustment is simple and permanent.

The COPES REDUCING VALVE

You'll find your COPES valve ports accurately designed for the correct capacities under the flow and pressure conditions you specify. You'll have no "hunting" to upset the precision of your control.

You'll find extra-heavy construction throughout. The valve piston is supported and guided in the areas subject to greatest velocities and forces. If these forces could cause excessive erosion, Stellite is welded to all contact surfaces before they are precision-ground to correct clearance for your installation. You'll find design and construction minimizes the possibility of sticking, leaking or vibrating. You'll suffer no objectionable noise.

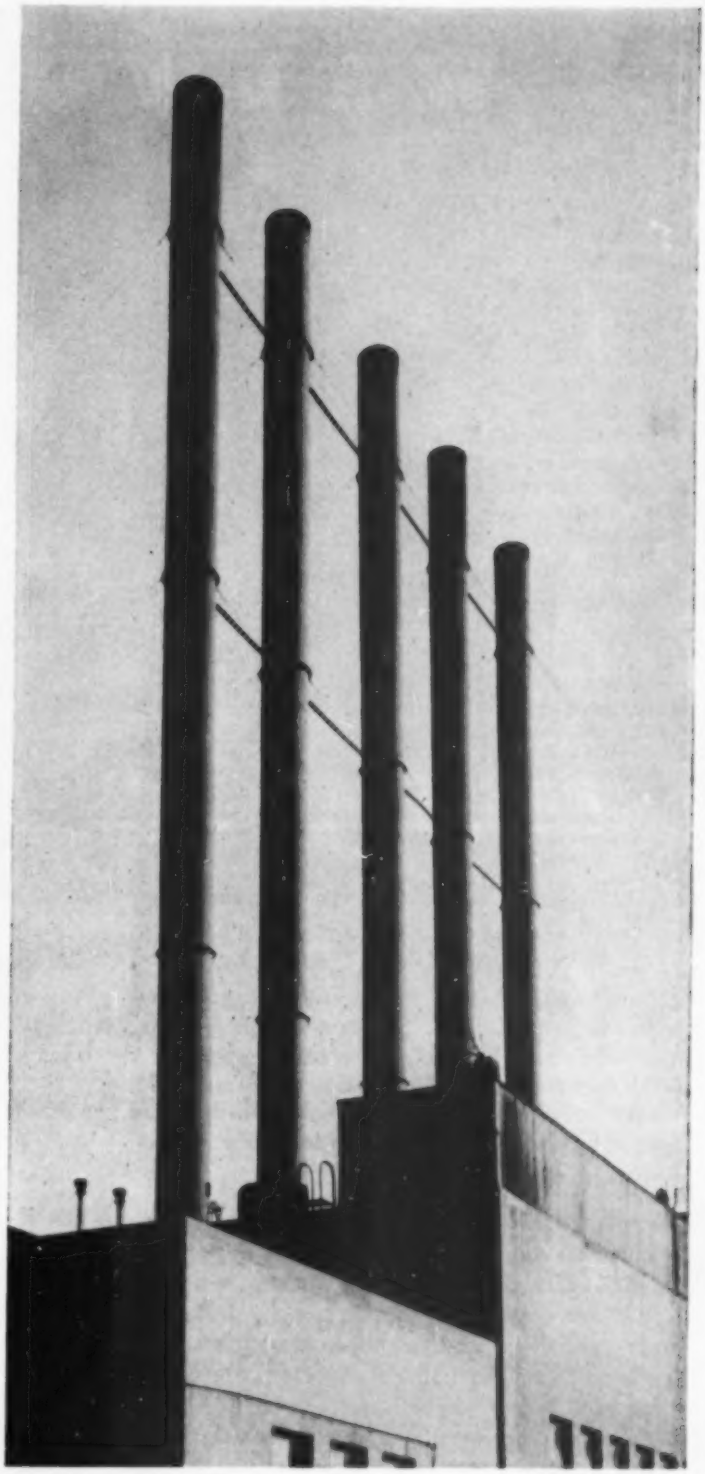
ENGINEERED BY THE MAKERS OF COPES FEED WATER REGULATORS

This Modern Chemical Producing Plant Used

BYERS WROUGHT IRON PLATES

TO KEEP THEIR STACK INVESTMENT FROM GOING

"UP IN SMOKE"



Because stack maintenance comes high, engineers of this modern chemical producing plant got "down to earth" facts before they selected material for the five new stacks at the Company's Chemical Plant, Louisville, Kentucky.

A thorough investigation of wrought iron's corrosion resistance, and past records of the material in stack service, indicated wrought iron plates as a solution to excessive maintenance and repair. The stack fabrication and erection job was turned over to W. E. Caldwell, Louisville. The stacks are 126 feet high and 54 inches in diameter.

With today's high maintenance costs, it's just plain good business to assure that every metal stack lasts as long as possible, with as little attention as possible. The importance of this move increases as stacks grow taller, for the higher the stack—the higher the cost of maintenance.

Byers Wrought Iron plate is a veteran in stack service. Engineering records provide convincing evidence of its superior durability. You can review some of these records, and see how wrought iron has helped others solve the problem of premature failure and maintenance by writing for a copy of our bulletin, WROUGHT IRON FOR FLUE GAS CONDUCTORS AND COAL HANDLING EQUIPMENT. It may help you . . . so write today.

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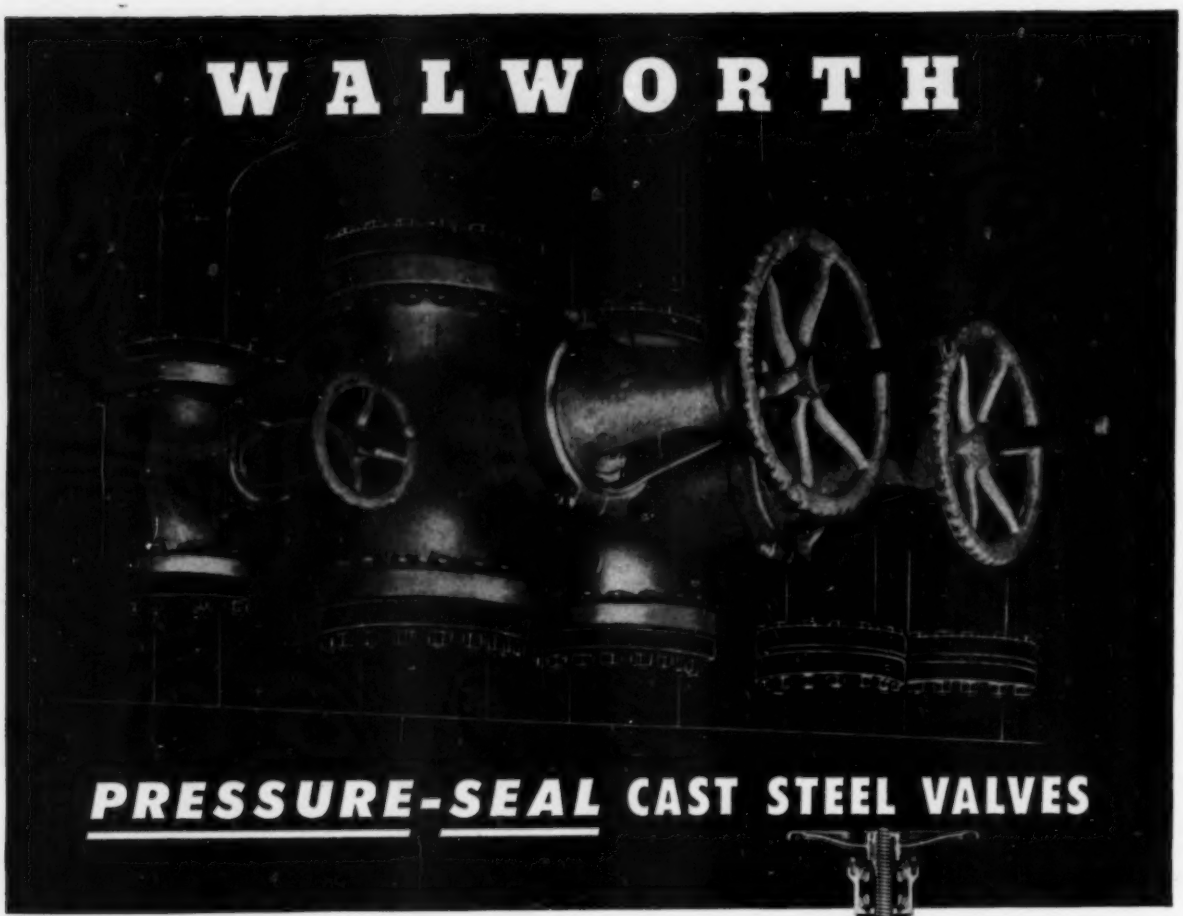
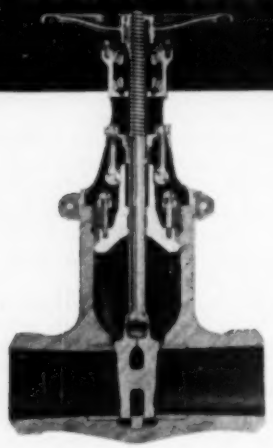


PRESSURE-SEAL CAST STEEL VALVES

Better because ... **They have no bonnet flanges, bonnet bolts, or bonnet welds. Ideal for high-pressure, high-temperature steam service and corresponding boiler feed service, Walworth Pressure-Seal Cast Steel Valves weigh less, and take up less space than the flanged bonnet type of valves used for similar services.**

These are a few of the important advantages made possible by the design of Walworth *Pressure-Seal* Cast Steel Valves. Internal line pressure is utilized within the bonnet to maintain a tight, leakproof, body-to-bonnet connection under all normal operating conditions. The higher the pressure, the tighter the seal.

Ask for your copy of Walworth Circular 143. It gives detailed information, including sizes, dimensions, and specifications for all Walworth Pressure-Seal Cast Steel Valves.



Cross section of 8-inch Series 900 Walworth Pressure-Seal Cast Steel Gate Valve. Pressure-Seal Globe, Check, Angle, and Non-Return Valves are also available in Series 600, 900, 1500 and 2500 in a wide range of sizes.

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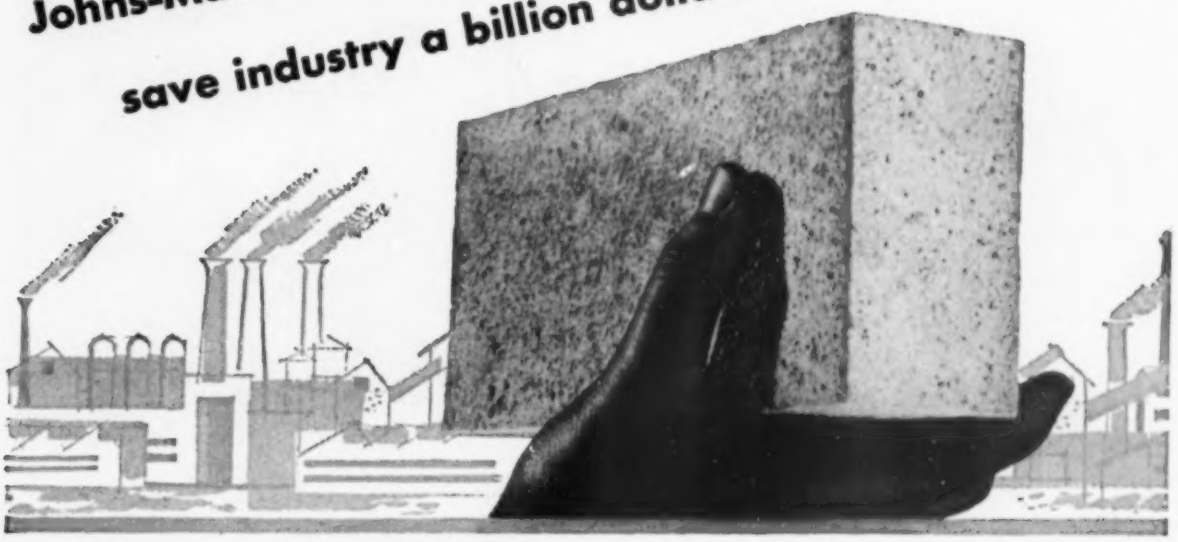
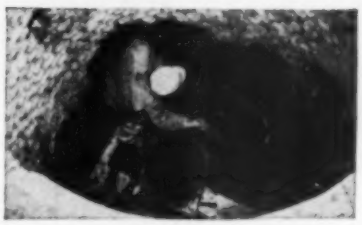


Reduce your fuel costs and build better furnace linings with JM-3000 INSULATING FIRE BRICK

HERE'S THE ONLY insulating fire brick that withstands a full 3000F. It's highly efficient both as an exposed refractory lining or as back-up insulation. And JM-3000 is only one of six types of Johns-Manville Insulating Fire Brick made for these applications. All provide long-life insulation. All are light in weight, have low conductivity, high structural strength. These properties permit thinner furnace walls—yet you can achieve important fuel savings and increased production, because J-M Insulating Fire Brick assures quick furnace response.

Sil-O-Cel* Insulating Brick is another outstanding J-M fuel-saver . . . a high load-bearing brick for back-up insulation behind refractory linings. It comes in three types, for service through 2500F—makes it possible to reduce the necessary thickness of refractory linings as much as one-third.



Save fuel with J-M Hydraulic Setting Refractories

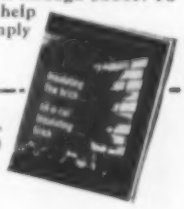
Johns-Manville refractories meet every need for castable, troweling and gunning applications for temperatures through 3000F. *Firecrete** is used to cast special shapes of all kinds. It is ready for use within 24 hours, has negligible shrinkage and high resistance to spalling. *Blazecrete** is used to build and repair furnace linings. When gunned, it adheres readily with a minimum of rebound loss. When slap-troweled, it eliminates laborious ramming and tamping.

Save Fuel with J-M Aggregates and Fills

These lightweight insulations are used as fills to conserve heat in irregular spaces where other forms of insulations cannot be economically applied. They are also used as aggregates for mixing with other materials to form insulating refractory concrete.

*Reg. U. S. Pat. Off.

Send for your free copy! This new booklet IN-115A gives full details about J-M insulating materials for service through 3000F. To find out how they can help cut your fuel costs, simply mail coupon.



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INERT GAS TUNGSTEN ARC-WELDING
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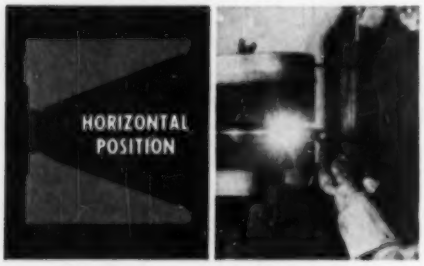
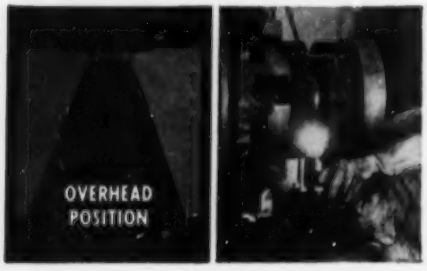
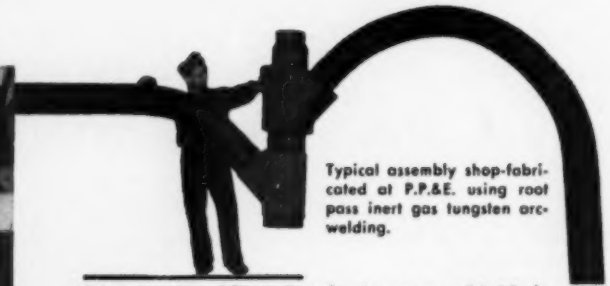
With proper groove design, and "free flow" of inert gas, internal contour of root bead is maintained regardless of welding position as shown in the photos below.

Inert gas tungsten arc root welds, made regularly in P.P.&E.'s laboratories, serve as a check on production procedures, as shown in three photos at right.



Welder's skill is an important factor in obtaining full penetration and fusion with proper internal contour of root bead.





Typical assembly shop-fabricated at P.P.&E. using root pass inert gas tungsten arc-welding.

First pass welding, by the inert gas shielded arc-welding method, is a standard production operation at Pittsburgh Piping. But — simply shielding the internal surface of the root bead with inert gas under "controlled" pressure does not automatically assure a sound joint. The position of welding, welding groove details, and the welder's skill are among the many critical factors.

Pittsburgh Piping's process provides an inert gas shield against the atmosphere on both internal and external surfaces of the root pass. This procedure, combined with other P.P.&E. processes, eliminates need for backing rings and double butt welding, and produces a sound, clean joint having a remarkably uniform root bead of proper contour.

Applicable to all types of power and process piping — inert gas tungsten arc-welding is another of the many techniques which have been thoroughly investigated and checked in P.P.&E. experimental laboratories before being generally used. It has been a successfully-applied production process at Pittsburgh Piping for years.

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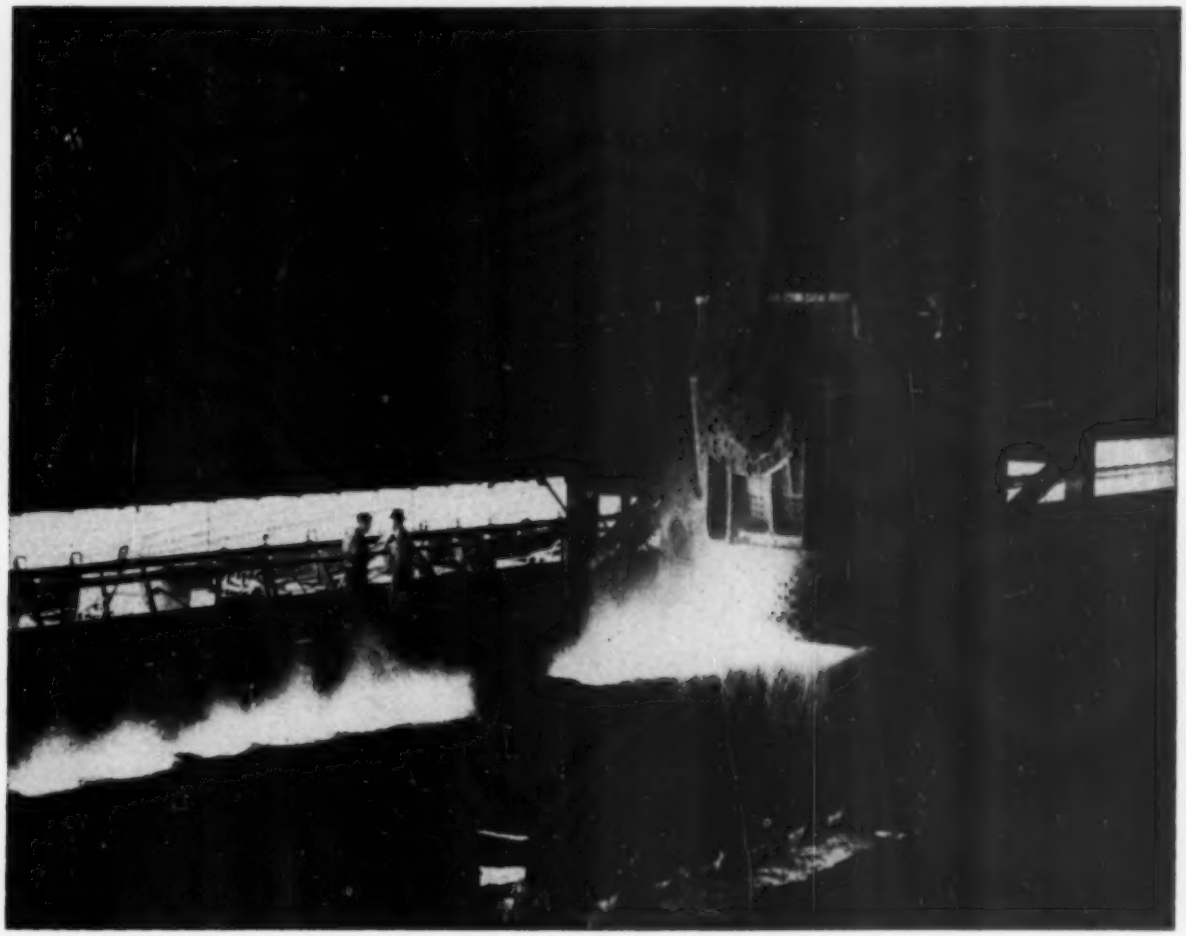
PP-6



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PRESENT DAY TAXES and production costs, plus the competitive conditions existing in industry today, make production *economies*, or *increased* production, almost essential . . . Correct lubrication can play a major part in *both!* The *exactly-right* lubricant for each machine will effect production economies by reducing power consumption, machinery wear (and subsequent replacements), and maintenance costs . . . On the increased production side, correct lubricants can be of vital assistance in enabling machinery to operate faster and longer, and reducing "downtime" by extending the time between scheduled overhauls . . . Your Standard Oil representative is qualified, by training and long experience, to assist you in the selection of *correct* lubricants. He knows a lot more about lubricants than just the selling of them. Why not call him in?

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LUBRICANTS

Chapman List 960

...for EVERY Small Forged Steel Gate Valve Application

Month after month, Chapman List 960 Valves deliver the goods on more different jobs than any other small forged steel gate valves. And maintenance charges are few and far between even under the toughest conditions.

The wedge gate faces — hardened to 800 Brinell by Chapman's exclusive Malcomizing process — won't seize or gall. Seat rings are hardened stainless steel, for minimum wear, and are easy to replace. Also, the bolted follower has no exposed threads on the yoke to corrode.

For every small forged steel gate valve application, specify Chapman List 960. Sizes from ¼" to 2", either rising stem with yoke (shown) or rising stem with inside screw. Bonnet joint is ground metal-to-metal or gasketed, depending on application. Pressure range is from 380 psi at 1000°F to 2000 psi at 100°F. For higher ratings, specify List 990.

List 960 is made in various alloys and combinations of alloys as listed in Catalog No. 10. Write for your copy today.

The CHAPMAN Valve Manufacturing Company
INDIAN ORCHARD, MASSACHUSETTS

TIMELY COMMENTS

Why We Must Enlarge Our PRIVATE WORKS Program

THE BILLIONS upon billions of dollars that individual Americans have invested in job-producing facilities in every field of enterprise constitute, in effect, an enormous private works program which has created nearly all of the 62 million jobs that exist in this country today.

Speaking at the annual meeting of the Charleston, West Virginia, Chamber of Commerce, Benjamin F. Fairless, chairman of the board of United States Steel, emphasized that only through the steady enlargement of this program can the problem of unemployment be permanently solved.

"As a nation," he observed, "we are firmly united in our desire to wipe out unemployment; but we are sharply, and even bitterly, divided on the question of ways and means. . . . In its simplest form, the issue boils down to a question of **public versus private works** . . . yet this is not—and never should be—a matter of partisan political debate. It is a straightforward **problem in economics.**

Conceding that there are many useful and necessary projects in the field of public works, Mr. Fairless said: "By stepping up work on such projects, the Government would not only provide for the immediate employment of thousands of men, but would also make a vital contribution to our national growth and development. So it is highly desirable, surely, that this should be done.

"But while this type of public works program is of permanent benefit to the nation as a whole, it affords only a stop-gap solution to the problem of unemployment; because seldom, indeed, does the average public works project provide continuing employment for anyone, after it has been completed. . . . It gives temporary jobs to those who are doing the work, but when it is finished, these men are right back where they started. They are unemployed again."

With private works projects, it is entirely different, Mr. Fairless declared. "When new industrial facilities are built," he said, "they not only provide temporary work for the men who construct the plant and who produce the machines and materials that go into it, but they also open up permanent jobs to the men and women who will operate the enterprise thereafter.

"Public works can—and should—provide temporary relief in times of stress; **but only by enlarging the private works program can we open up permanent jobs for our growing labor force."**

The Incentive to Invest

Mr. Fairless pointed out, however, that a public works program can be started, by Congress and the President, "at the drop of an index"; but that the size of the private works program depends upon the individual, day-to-day decisions made by millions of persons.

"It cannot be enlarged by government edict," the speaker declared. "All that Congress and the President can do is to protect and preserve, in every proper way, the precious spark of incentive which prompts Americans to invest their savings in job-creating enterprises.

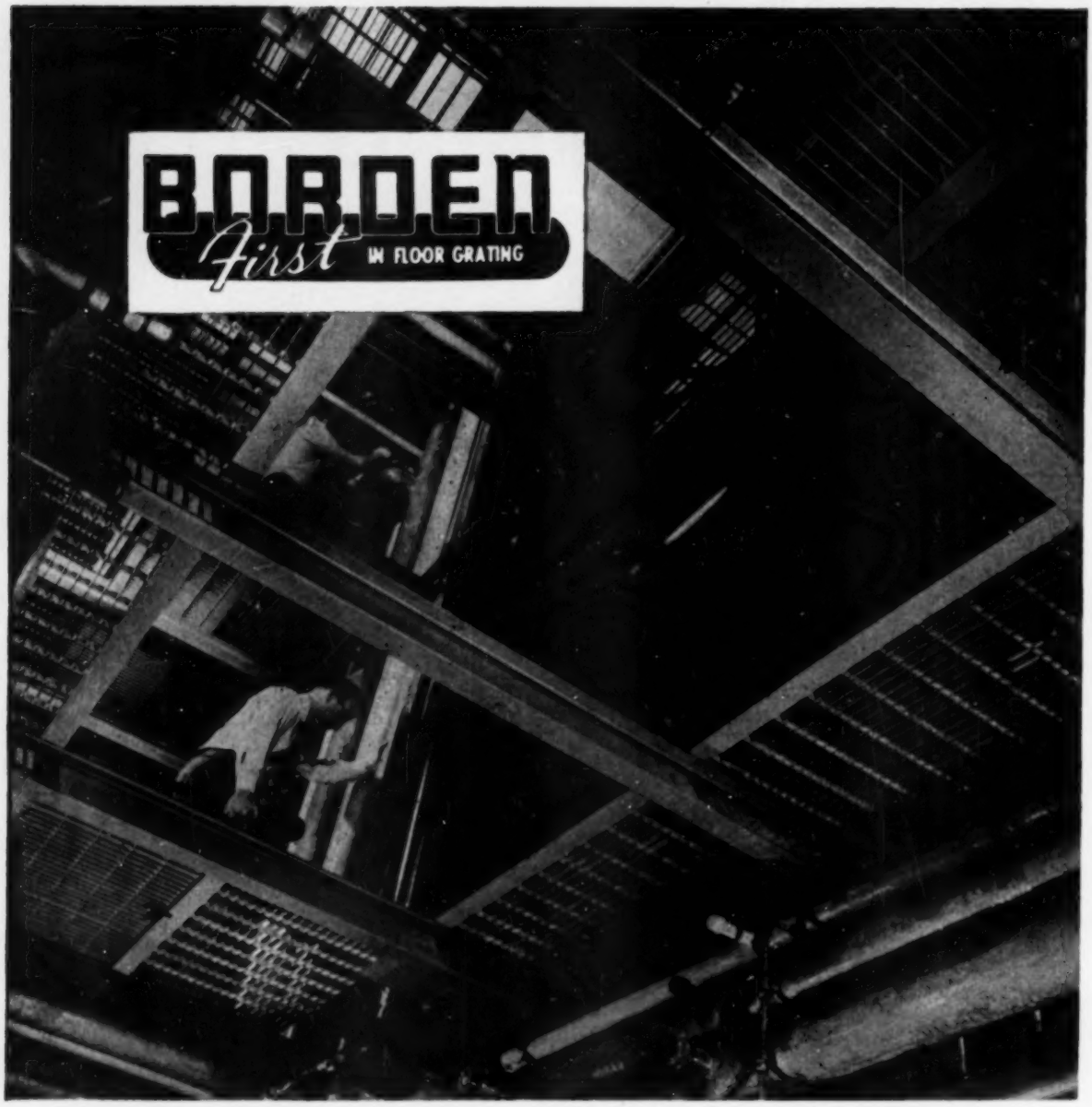
"Yet whenever Congress tries, as it did this year, to encourage that type of investment, its actions are universally denounced by the very people who loudly insist that their hearts are bleeding for the unemployed. . . . Their solution of the problem would be to diminish existing incentives—not to enlarge them. And, of course, it just doesn't make sense."

Pointing out that **private industry** last year had **invested nearly $28 billions** in new plants and facilities, thus providing and maintaining jobs for some 2 1/3 million workers who would otherwise be unemployed, Mr. Fairless asked his audience to consider what would happen if industry had been unable to obtain these funds from any source, and if the Government had then been compelled to step in and take over the private works program. Where, he asked, would it get the $28 billions?

"Well, incredible as it may seem," he reported, "the truth of the matter is this: that if the Federal Government were to take from every taxpayer in this country, every penny of his taxable income above $2,000 a year, it still wouldn't get the $28 billions. . . .

"Each taxpayer—after claiming his usual exemptions and deductions—would still pay a 20%

(*Continued on page* 100)



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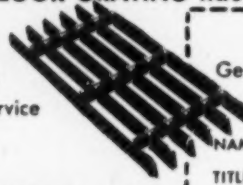

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INDUSTRY SPEAKS

TENNESSEE METALWORKING

Diversification is the Keynote
The Clouds are Titanium Lined

Adapted from comments by **WALTER C. LONG** before the recent **Southern Metals Conference** in Atlanta, Georgia. Mr. Long is Assistant Director, Industrial and Agricultural Development Commission, State of Tennessee, Nashville, Tenn.

TENNESSEE has about 13,000 employed in primary metal industries (foundries, and aluminum and copper producers) and about 39,000 in metal fabricating industries (metal products, machinery and transportation equipment). Production by metal industries in Tennessee represents more than $162 million in value added through manufacture.

Chattanooga is one of the principal metalworking centers with about 3600 employed in primary metals and about 9,000 in other types of metal operations. Outstanding operations include **Combustion Engineering Co.**, which has two large boiler fabricating plants.

The Wheland Co. is a major grey-iron producer as well as a fabricator of oil-drilling equipment and portable saw mills. Wheland recently started a new plant for the manufacture of 75 and 90 mm anti-aircraft cannon.

Crane Company has a large cast-iron enamelware plant in Chattanooga with an annual melt average of 80,000 to 90,000 tons.

Samuel Stamping & Enameling Co., established in 1926, has developed into a major appliance producer with its own line of gas furnaces and ranges as well as gas and electric built-in ovens and surface units.

Ross-Meehan Foundries, nationally known for "Meehanite" castings, has recently installed special equipment enabling it to become the South's first concern to manufacture military tank steel castings.

The Cavalier Corp. has an appliance plant which turns out such items as Coca-Cola and other beverage coolers of many types and models, electric floor furnaces and heaters, all-metal porch and lawn folding chairs and furniture.

Koehring Southern Co., a subsidiary of the Koehring Co. of Milwaukee, manufactures at Chattanooga one-half yard capacity cranes and excavators mounted on crawlers and trucks.

Chattanooga Royal Co. is a well known manufacturer of gas heaters, fireplace fixtures and portable barbecue grills.

Tennessee Products & Chemical Corp. at Chattanooga makes ferroalloys and also operates pig-iron blast furnaces at Rockwood near Knoxville. They have recently acquired the Somerville Iron Works at Chattanooga, making cast iron soil pipe and fittings.

Tennessee may also become one of the country's leading producers of titanium. **Cramet, Inc.**, a wholly owned subsidiary of the Crane Company, is now constructing a $25,000,000 titanium reduction plant which will have an annual output of about 6,000 tons of titanium sponge. This production together with the proposed titanium plant under study by **E. I. du Pont** for location at New Johnsonville will bring the state's production of titanium to about 13,000 tons a year, nearly half the total national production scheduled by 1956.

The production of rolled and sheet aluminum at Alcoa, near Knoxville, by the **Aluminum Co. of America**, constitutes a significant amount of the national total. **Aluminum Foils, Inc.**, at Jackson, rolls extremely thin foil for the cigarette industry.

Tennessee also is the sole major producer of copper ores in the South. At Copperhill, **Tennessee Copper Co.** produces over 7,000 tons of blister copper annually. Manganese is electrolytically refined at Knoxville by the **Electro Manganese Co. Greenback Industries** produces powdered iron and copper in the Knoxville area.

There are numerous metalworking operations at Memphis, Nashville, Knoxville, Cleveland, Athens and Lewisburg. There are important and well known foundries at Nashville and also such metal fabricators as **Avco Mfg. Corp.**, which makes "Crosley" and "Bendix" appliances, **Nashville Bridge Co., Temco, Inc.**, producer of gas appliances, and **Kerrigan Iron Works, Inc.**, producer of steel flooring and stair treads.

Sheet metal fabrication is important at **Memphis** which is the site of operations by such metal using industries as **Ford Motor Co.; International Har-**

(Continued on page 65)

How Liggett & Myers Tobacco Company met increased process steam demand

BOILER PLANT MODERNIZED

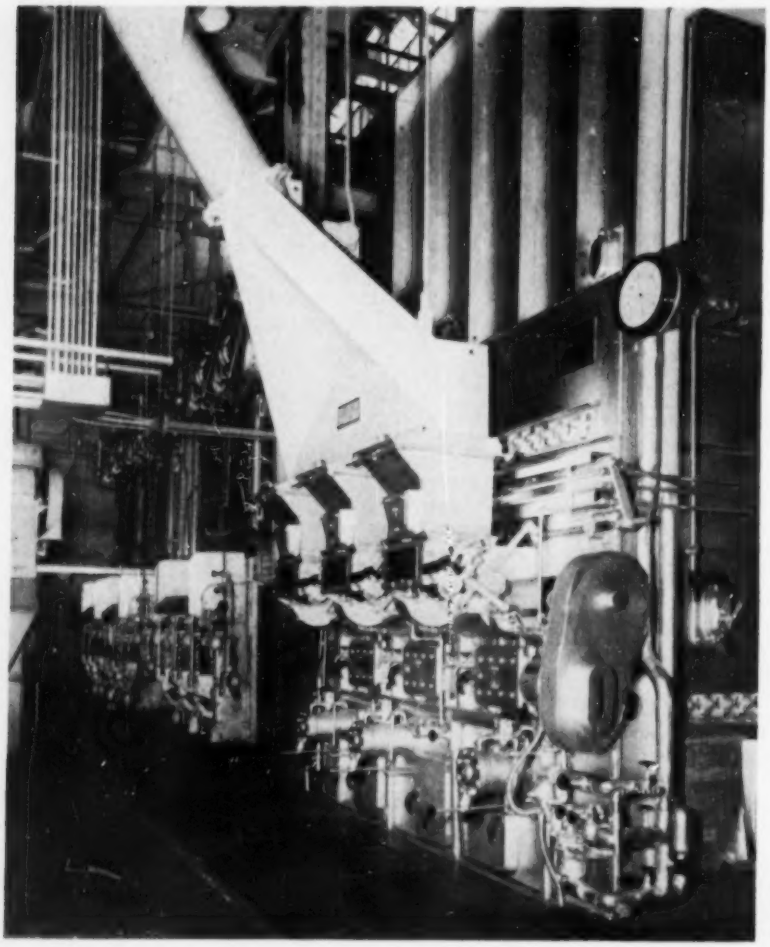
By C. D. FAUCETTE,
Chief Engineer
Liggett & Myers Tobacco Co.
Durham, North Carolina

and

J. C. POUNDS,
Plant Engineer
Liggett & Myers Tobacco Co.
Richmond, Virginia

Better combustion, higher efficiency, adequate smoke control, reduced coal and ash handling, and more constant pressure at high rating with new boiler, spreader stoker and auxiliaries.

LIGGETT & Myers Tobacco Co., Richmond, Virginia, was supplied process steam by its original boiler plant until late in 1953. Installed in 1926, the plant consisted of three 192 hp Babcock and Wilcox longitudinal drum water tube boilers. The boilers were set two in a battery, and one single. They were fired by Huber stokers with natural draft supplied by a brick chimney 125 ft high. Auxiliary equipment consisted of two reciprocating steam boiler feed pumps, one 1000 hp Cochrane feedwater heater, and a Venturi type totalizing feedwater meter.

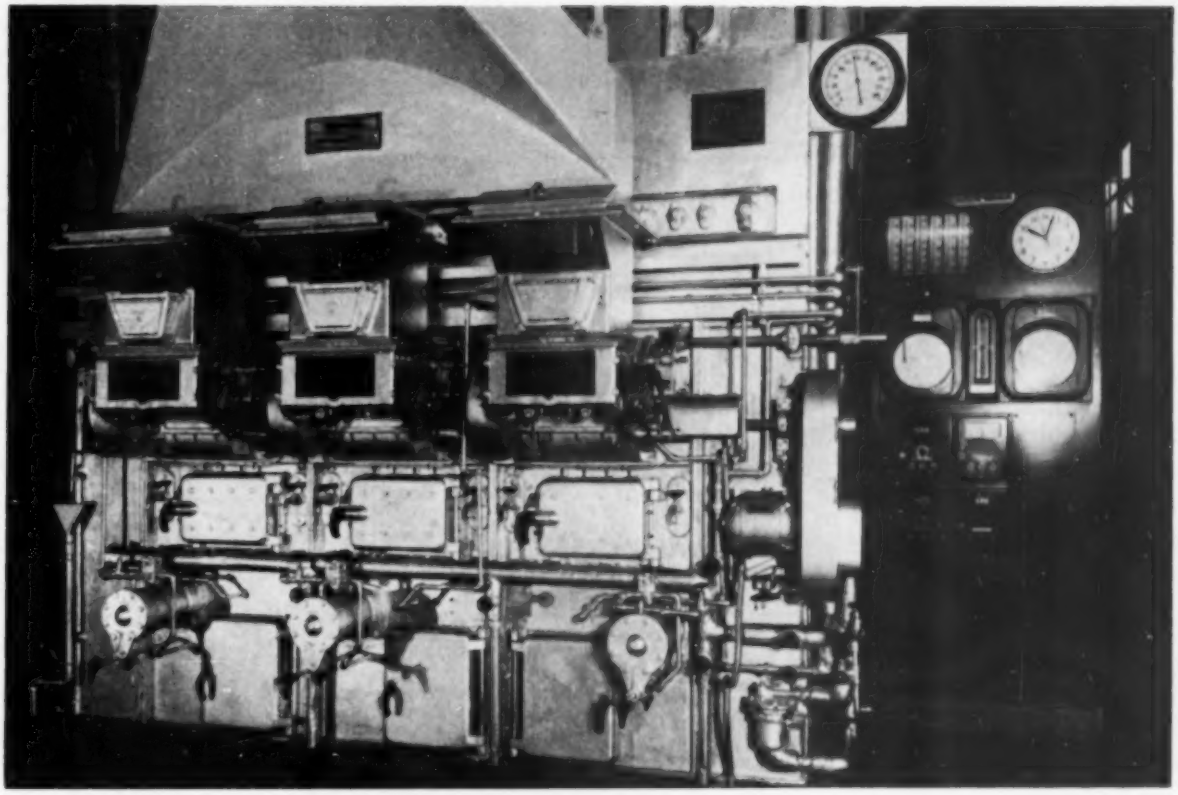


VIEW OF FIRING AISLE
New Stoker in Foreground

More Capacity Needed

In 1952 steam demand had developed to a maximum of 35,000 lb/hr and required the use of three boilers as a maximum and two as a minimum. With two of the boilers in a battery setting, there was no opportunity to make any major repairs in the common wall. These conditions indicated that additional capacity was needed.

We had found that the original boiler and stokers had a tendency to produce smoke, and with the increase in boiler rating that we were forced to use conditions became worse. Over-fire air was introduced but did not help enough to prevent criticism from the City of Richmond Smoke Abatement Department. Our annual average steam-coal rate was found to be only 7.6.



FRONT VIEW OF NEW STOKER AND CONTROL PANEL

Equipment Selected

Lockwood Greene Engineers, Inc., were retained to study our problems. Most of their recommendations were carried out under their supervision. The following equipment has been installed along with valves, regulators, etc., necessary to tie in with the old boilers.

Boiler—One Babcock & Wilcox Type FJ-18-32 integral-furnace boiler, 5011 sq ft of heating surface, operating at 140 psig with a capacity of 35,000 lb/hr.

Forced Draft Fan—One Green fan with ball bearings, full housing, inlet screens and outlet damper. Design conditions specified were 50,200 lb/hr air at 105 F against 5.3 lb static at 1760 rpm and 14.0 bhp. The fan is driven by a General Electric 15 hp, 1800 rpm, 440 volt motor with Waldron coupling, magnetic starter, and push-button station.

Induced Draft Fan—One Green fan with blade liners, ¼" steel scroll liners, full housing, water cooled bearings, inlet boxes and outlet damper. Design conditions were 58,300 lb/hr gas at 4.8" static and 530 F at 875 rpm and requiring 28.3 bhp. The drive is a General Electric 30 hp, 900 rpm, 440 volt, motor with Waldron No. 2½ A coupling, magnetic starter and push-button station.

Dust Collector—One Prat-Daniel, tubular multicyclone, with one 6' dust hopper discharging into the cinder return system.

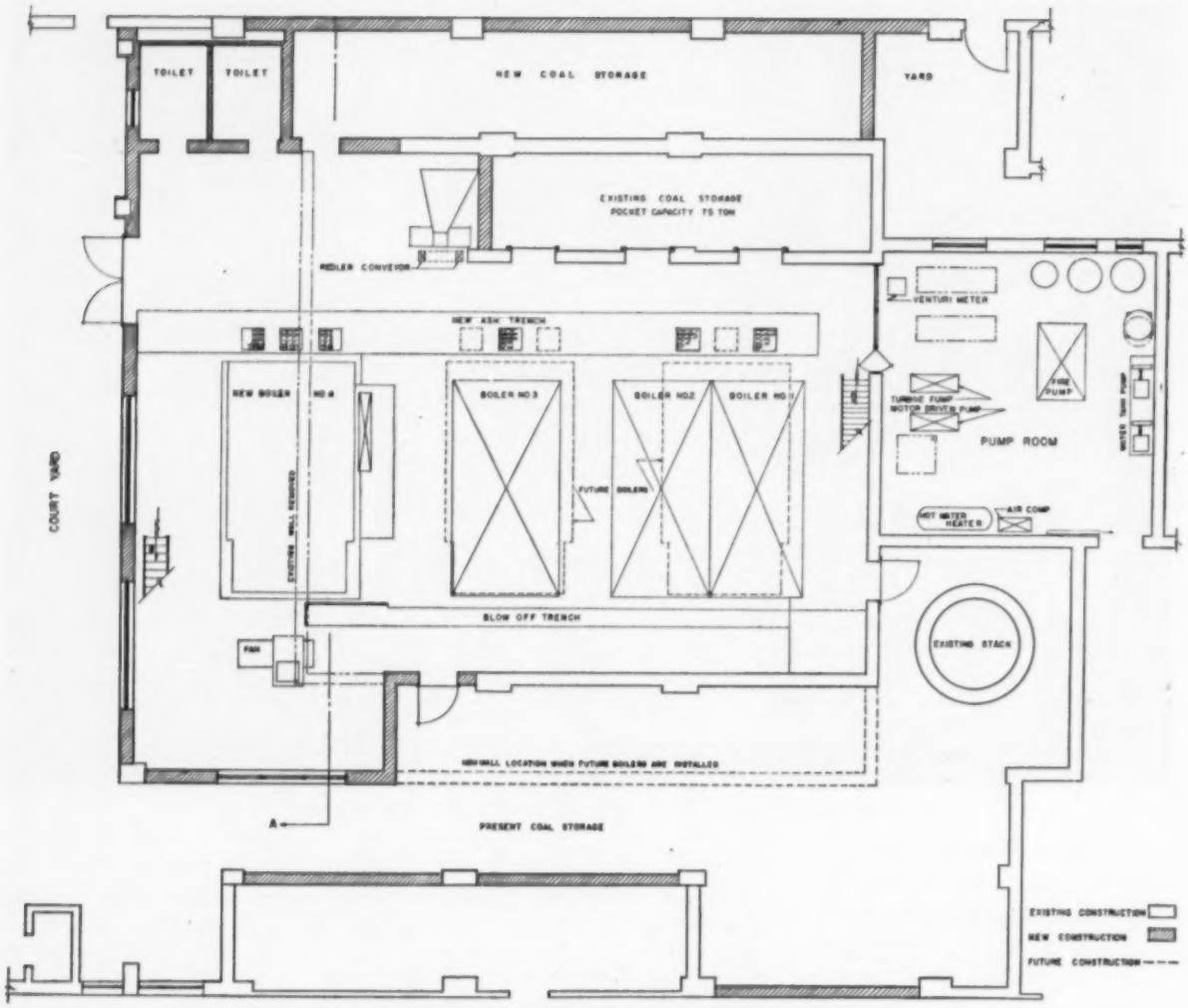
Stoker—One Detroit RotoStoker (spreader type) with power operated dumping grates in three longitudinal sections, for intermittent ash discharge. The stoker is supplied from a three section steel plate hopper and is driven by a 1½ hp, 440 volt motor with magnetic starter and Reeves varispeed drive. Detroit Stoker overfire air and cinder return system consisting of one motor-driven fan and air ducts, air jets and conveyor pipes from collecting hoppers to the furnace was included.

United Conveyor Co. furnished a complete system of pneumatic ash conveying from intakes at the front of the boilers to the storage bin, with an average full load capacity of 9 tons of dry ash per hour.

Deaerating Heater—One Cochrane Corp. with an outlet capacity of 60,000 lb/hr, consisting of 30,000 lb/hr makeup at 55 F and 30,000 lb/hr condensate return at 180 F for operation at 5 psig average steam pressure. The Cochrane heater is designed for 30 psig ASME code welded construction and consists of a 42" dia., 54" high stainless steel tray type deaerating section mounted on top of a horizontal storage section, 60" dia.

Water Softening System—One Cochrane double unit (two 3' units) manually operated, sodium zeolite water softener system for 60 gpm average rate of flow and 70 gpm maximum with a capacity of 48,400 gallons between regenerations, based on raw water hardness of 3.8 grains per gallon.

Boiler Feed Pumps—Two Worthington two-stage volute pumps operate at 3500 rpm with 52.5% efficiency, 26 bhp, and have a ca-



PLAN OF POWER PLANT SHOWING ADDITIONS

pacity of 120 gpm at 200 psig discharge pressure and 228 F water temperature, 14 ft suction head and 471 ft total dynamic head.

One of the pumps is driven by a direct connected General Electric 30 hp splash proof motor and the other by a Worthington single stage non-condensing turbine. Latter is rated 30 bhp at 3500 rpm, with inlet steam at 125 psig and exhausting at 10 psig back pressure, with water rate of 71.2 lb/bhp/hr. Turbine is equipped with one hand valve, mechanical shaft type governor, separate overspeed trip, integral type steam strainer and sentinel relief valve.

Coal Handling—Coal is unloaded from hopper cars by dumping to an underground belt conveyor, thence to a new overhead silo by a vertical Redler conveyor. The Stock Equipment Co. furnished an automatic dustproof coal scale with a rated capacity of 10 tons/hr and with a weigh hopper of 200 lb capacity.

Auxiliary equipment includes: a dust-tight coal valve with 18" square top flange and 16" x 20" bottom opening, operating on dust-sealed roller bearings; a 16" O.D. downspout connecting scale outlet hopper to conical distributor; conical non-segregating coal distributor, 90" wide at the outlet, formed into three outlet nozzles to meet the three Detroit Stoker hoppers; one pole paddle type coal alarm installed over the feed belt of the coal scale; and another coal alarm on the top cone of the conical distributor. The stainless steel paddle has a switch mounted on the alarm shaft so that when no coal is present, the paddle hangs vertically and the switch closes the alarm circuit.

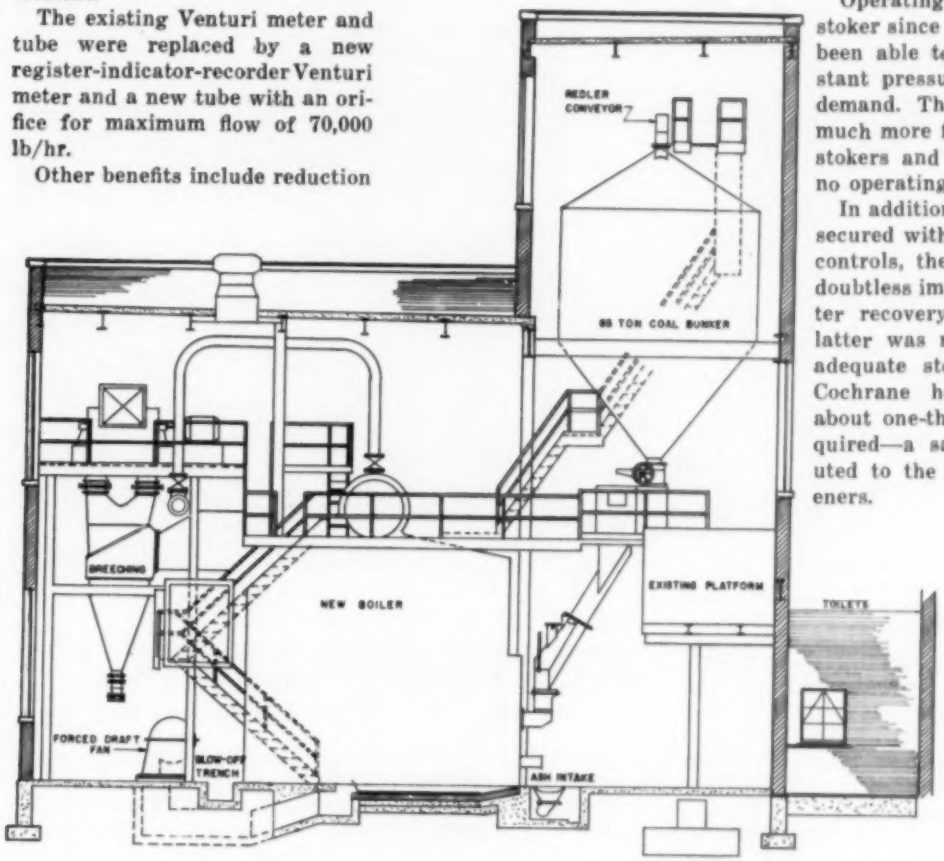
Instruments and Controls—Automatic combustion control system, draft gauge, steam flow-air flow boiler meter, boiler water level indicator and a combination pressure and temperature recorder for measuring feedwater pressure, temperature and steam pressure, were furnished by the Hays Corporation.

Draft gauge indicates F.D. fan pressure, furnace draft, uptake draft and three stoker zone pressures.

Steam flow-air flow three-pen electric indicating-recording and integrating boiler meter has 6" orifice plate, condensation reservoirs, integral equalizing and shut-off valves, electric chart drive, and flue gas temperature measuring element.

The existing Venturi meter and tube were replaced by a new register-indicator-recorder Venturi meter and a new tube with an orifice for maximum flow of 70,000 lb/hr.

Other benefits include reduction of labor in coal and ash handling, a cleaner boiler room, adequate smoke control and improved performance records through the introduction of continual coal weighing.



SECTION THROUGH POWER PLANT

Better Production

With the installation of this equipment, our steam coal rate (formerly 7.6) increased up to 11.7 with the most suitable coals. The coal that works best in this stoker is 1" x 3/8", 25% volatile.

Operating the new boiler and stoker since August, 1953, we have been able to maintain more constant pressure under high steam demand. The spreader stoker is much more flexible than the other stokers and we have experienced no operating difficulties.

In addition to better combustion secured with the aid of automatic controls, the steam-coal rate was doubtless improved because of better recovery of condensate. The latter was made possible by the adequate storage section of the Cochrane heater. Blow-down is about one-third that formerly required—a saving of heat attributed to the effect of water softeners.

TENNESSEE METALWORKING—Diversification is the Keynote

(*Starts page* 61—*See "Industry Speaks"*)

vester Co.; **Rotary Lift Co.**, which makes hydraulic elevators and lifts; **Borg-Warner Corp.**, whose Mechanics Universal Joint Division makes universal joints for the automotive industry; **Hunter Fan & Ventilating Co.**, acquired in 1950 by Robbins & Myers, nationally known fan and electrical motor manufacturer; and the **American Bridge Division** of U. S. Steel Corp.

Knoxville is the home of **Knoxville Iron Co.**, Tennessee's only steel mill; **Fulton-Sylphon Division** of Robertshaw-Fulton Co., which is a major producer of metal bellows for temperature controls; **Dempster Bros., Inc.**, and **Brooks Equipment & Mfg. Co.**, both manufacturers of materials handling equipment.

Many recent developments in the metalworking field have been by fabricators. Among these are **American Metal Products** at Union City, which is making automobile seat frames, **Holley Carburetor Co.** at Paris, which is manufacturing carburetors, and **Yale & Towne** with two plants at Gallatin and Lenoir City making builders' hardware.

Other recent additions, some of which have already been mentioned, include International Harvester, Borg-Warner and Laclede Steel at Memphis, Koehring Southern, Cramet, and Southern Electrical Corp., a wire manufacturer, at Chattanooga, and the transfer of the "Bendix" operations of Avco Mfg. Co. to the Nashville plant of that company.

INDUSTRIAL USES OF ISOTOPES

By JOHN F. LEE*
Consultant on Atomics
for Southern Power & Industry

Current uses of isotopes are described in general terms and the potentialities of these industrial tools are discussed with particular reference to Southern industry.

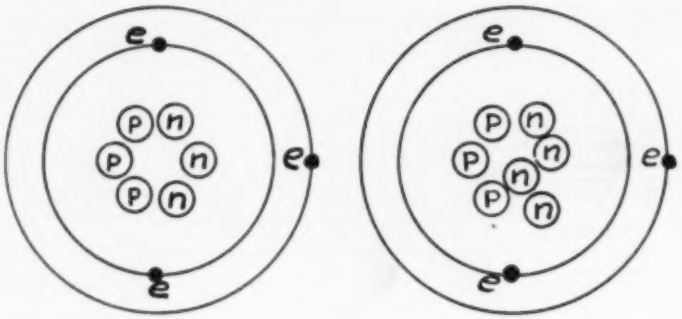
A LARGE number of articles and papers on the biological, medical and agricultural uses of radioactive isotopes have been published. However, comparatively few articles on the industrial applications of isotopes have appeared even though industry is the biggest potential user. Industry is aware of the importance of these powerful new tools and they are already used in several important manufacturing processes. But wide and diversified industrial use seems delayed —probably because of insufficient knowledge on the part of industry about the health hazards and lack of experience in handling radioactive substances. Another possible reason is the limited availability of facilities for producing radioactive isotopes.

The expanded facilities at Oak Ridge and the availability of the specialized facilities of the Materials Testing Reactor at Idaho Falls should also promote general utilization of isotopes in industry.

What Are Isotopes?

Before discussing the nature of isotopes it is desirable to review some of the characteristics of the atom. Formerly the atom was defined as the smallest (indivisible) particle of a chemical element. We now know that the atom can be split. However, the resulting fragments are no longer identifiable with any particular chemical element but are components of any and all chemical elements.

An atom of any chemical element is composed of a *nucleus* formed of *neutrons* and *protons* about which circulate other particles, known as *electrons*, in a planetary system. The proton has a positive electric charge, the electron has a negative charge, and the neutron has no charge at all. The mass of a proton is approximately 1800 times that of an electron and is nearly equal to that of a neutron.



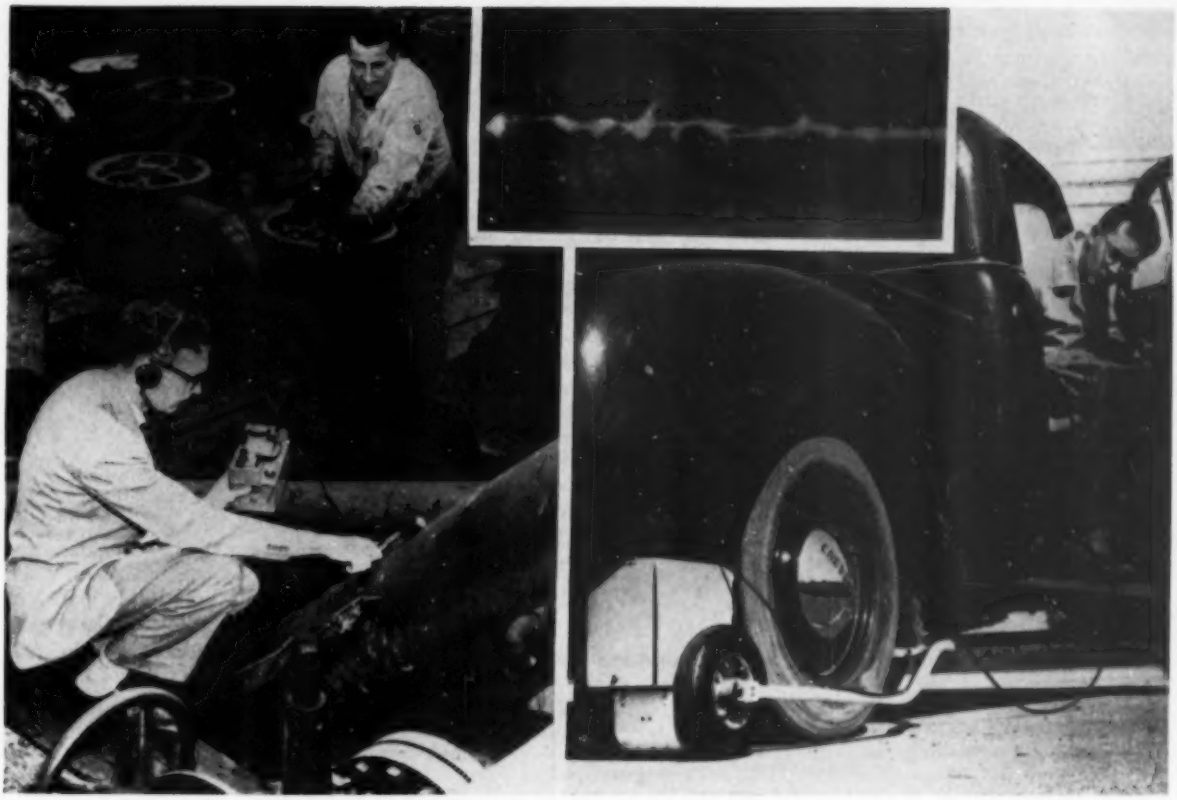
Atomic structure of normal element and isotope. Lithium-6, the normal element, is at left. Lithium-7, an isotope, is at right.

An atom is electrically neutral and therefore the number of protons in the nucleus must be equal to the number of electrons in the planetary orbit. The neutrons obviously do not affect the electrical neutrality since they have no charge. As the chemical nature of an element is fixed by the number of electrons or protons, it is possible for the atoms of a given chemical element to have different numbers of neutrons in the nucleus and yet have its chemical nature unchanged. Such atoms are called *isotopes*, that is atoms of the same chemical element with different numbers of neutrons in their nuclei.

Isotopes of chemical elements, for example heavy water and ozone, are found in nature. These isotopes are *stable* and must be separated from other matter by physical means. *Radioactive isotopes* are produced by inserting a substance in a nuclear reactor or they may be separated from the waste fission products resulting from nuclear reactions. The nuclei of the substance absorb neutrons and *unstable* or radioactive isotopes are formed.

A radioactive isotope will seek to become stable. It may emit a *gamma ray* to form another unstable isotope. This unstable isotope may then become stable by emission of *beta radiation*, a process known as *beta decay*. In a given period of time a certain number of radioactive isotopes will become stable. The time required for one half of the nuclei to return to a stable state is

* Mr. Lee is Professor of Mechanical Engineering, North Carolina State College, Raleigh, N. C.



THESE VIEWS SHOW A FEW INDUSTRIAL USES OF RADIOISOTOPES

Left—Separation of pipeline shipments, especially of oil, is made easier by running a quantity of radioactive material between different types of liquids. Geiger counters clock the end of a shipment as soon as the radioactive layer appears.

Above—Flaws in castings and defects in industrial materials can easily be detected by radioisotopes. Here, a poor welding job is exposed, revealing slag and lack of fusion.

Right—Tire wear can be measured by incorporating radioisotopes into tire treads. Here, a Geiger counter gives a researcher a quick measure of wear on the trailer tire behind the truck. Wear on all kinds of tires may also be checked and studied by exposing X-ray film to the road over which the radioactive tire has passed.

known as the *half-life* of the isotope.

How Isotopes Are Used

Having discussed the nature of isotopes we now consider how they may be used as a tool in industry. We shall consider only the radioactive isotopes because the use of stable isotopes requires complicated and expensive spectrographic equipment.

Radioactive isotopes may be used as *tracer* elements or as *ionizing* agents. Used as a tracer a radioactive isotope is substituted for a normal chemical element which takes part in some process. Because of its radioactivity the isotope may be traced and the entire history of this particular element's part in the process can be outlined. A Geiger counter or X-ray film is used to follow the path of the tracer.

Radioactive isotopes may be used as ionizing agents where the isotope is simply a source of penetrating radiation. When an atom or molecule of a substance is split into two oppositely charged particles we have what is called the process of ionization. A common example of ionization is a solution of table salt (NaCl) in water. The solution is ionized because the action of water separates the chlorine and sodium as free ions. Chlorine then has a negative charge and sodium a positive charge. Similarly, when alpha, beta, or gamma radiations pass though air, the molecules of air are split into positive and negative particles, or ions, and the air becomes a conductor of electricity.

Isotopes in Industry

We are now in a position to describe some specific industrial applications of isotopes in current use. There are over 1858 non-government users of radioactive isotopes and to describe all of these applications in detail would be clearly impossible in a single article. In-

stead, we shall limit the coverage to brief descriptions of those applications which are of particular interest to Southern industry.

Textile Industry

In the manufacture of rayon and other yarns it is necessary to lubricate the yarn after spinning it in order to facilitate the collecting and the following processes. The quality of oil used for lubrication must be only enough to accomplish the purpose and is accurately controlled. Therefore, it is important to know how evenly the oil coating is distributed over the surface of the yarn.

One method is to activate a bromine derivative in a nuclear reactor to produce bromine-82 which has a half-life of 36 hours. The bromine-82 being miscible in oil is added to the lubricating oil. The distribution of the oil is easily determined by winding the yarn on a drum and then exposing it to X-ray film.

Another problem in the textile industry is encountered when automatic cutting or folding of cloth takes place. When wool or synthetic fibers are combed a certain amount of static electricity is generated which later interferes with the proper operation of the folding and cutting operations. Sometimes the static charge builds up to where it constitutes a definite fire hazard.

One solution to this problem is to use radioactive beta emitters, such as thallium-204, which give a very intense ionization. By means of this ionizing source the air in the area where static electricity is generated becomes ionized. Thus the air conducts away the static electricity and offers positive control of the problem at low cost.

Oil Industry

Radioactive isotopes are useful in locating oil-bearing strata when trial drilling is in progress. One very successful method is to lower a neutron source (a radioactive substance emitting neutrons) and a detector down the bore-hole. The neutron source and the detector are shielded from each other so that the only neutrons activating the detector are those which have been first scattered by the surroundings. In dry strata the neutrons are absorbed by the surroundings and the activity of the detector is low. When the neutrons encounter hydrogen atoms the scattering is large and the activity of the detector is high. High detector activity indicates the proximity of oil or water and all that is required is an electrical conductivity measurement to determine which is present.

Another interesting application of radioactive isotopes in the oil industry is in checking the progress of a "go-devil" used to clear pipe lines of sludge. The "go-devil" can be designed so that a quantity of some radioactive source, such as cobalt-60, can be inserted in it. The position of the "go-devil" can be located at all times by means of a Geiger counter. Radioactive isotopes are similarly used when batches of different grades of oil are to be pumped successively through a pipeline. The type of oil reaching a given destination can be readily determined for separation by simply putting a small amount of radioactive material in the first few gallons of each grade of oil pumped. A Geiger counter mounted outside the pipe will indicate when each new grade of oil reaches its destination.

A further application of radioactive isotopes is in connection with the determination of the relative effectiveness of various lubricating oils, particularly in reciprocating engines. If lubrication were perfect there would be no transfer of metal from one sliding surface to another. In the case of Diesel and automobile engines the rings can be made from a melt in which one

Typical Cost Data for Radiographic Equipment and Isotopes

A COMPLETE survey of cost data for radiographic equipment and the numerous radioactive isotopes would require much space. However, some relative conception of costs can be obtained from an examination of only a few typical examples.

Radiographic Equipment. It is difficult to make an accurate cost comparison between radiographic and conventional X-ray equipment without a detailed consideration of such factors as the intended use, the thickness of the material to be examined, the nature of the source, and the required accessories. Operating costs, in which the consumption of electricity in X-ray equipment is an important element, requires careful consideration.

The nearest thing to a typical comparison would be $900.00 for complete radiographic equipment with Cobalt-60 as a source against $80,000.00 for equivalent X-ray equipment. The price for the radiographic equipment includes the source, container, magnetic handler, radiation measuring equipment, film badge service, pocket dosemeter and its charge. The X-ray equipment would include a generator of two million volts, the equivalent of Cobalt-60 in penetrating power.

Specific cost data for a particular application can be obtained from a number of sources including Tracerlab, Inc., 130 High Street, Boston 10, Massachusetts.

Radioactive Sources. Here again several factors influence the price of radioactive isotopes such as the strength of the source, the thickness of the material being investigated, the half-life, and whether or not quantity purchases are to be made. Cobalt-60 which has sufficient penetrating power for thick sections such as valve castings and Cesium-137 which is suitable for thin sections are given as examples. The left-hand column gives the nominal source strength in Curies.

Cobalt-60 (Half-life: 5 years)

Curies	Price
0.01	$160
0.1	180
0.5	200
1.0	225
1.5	275
2.0	300
3.0	350
5.0	400
10.0	600

Cesium-137 (Half-life: 33 years)

Curies	Price
0.5	$200
1.0	275
2.0	640
3.0	835
5.0	1095
6.0	1225

Price lists for various radioactive isotopes may be obtained from Tracerlab; U. S. Atomic Energy Commission, Isotopes Division, Oak Ridge, Tennessee; or from the Director, Materials Testing Reactor, Phillips Petroleum Company, Operators, P. O. Box 1259, Idaho Falls, Idaho.

of the normal alloying elements is made radioactive. The relative quantities of metal from the rings carried away in the lubricating oil can be checked readily by a Geiger counter reading of the radioactivity of the oil. If it is desired to find the wear pattern for each individual ring it is only necessary to spread X-ray film on the inside surface of the cylinder.

Steel Industry

Only three applications in the steel industry will be described although these will suggest many others. For example, it is often necessary to reduce the content of some alloying element or impurity in steel making. Nearly all the elements important to steel making can be made radioactive. In one case radioactive phosphorous was introduced instead of the normal phosphorous. It was possible not only to determine the distribution of phosphorous between the slag and molten steel but also to find the time required for equilibrium to be reached.

In gas-heated open-hearth furnaces the sulfur in the gas supply must be taken into account in controlling the sulfur content in the final product. By injecting radioactive sulfur into the gas it is possible to make a rapid determination of the proportion of sulfur contained in the gas which will appear in the steel. Formerly it was necessary to grind thin samples and place them in contact with X-ray film, a procedure that required four or five days' time.

A patented method for the rapid determination of slag in hot-rolled sheets or plates is provided by utilizing a radioactive isotope which mixes with the slag but not with the metal. The isotope is introduced during the molten stage and is widely dispersed in the melt. After hot rolling, the surface of the sheet is scanned by a Geiger counter permitting the inspector to mark for rejection the sections con-

(*Continued on page* 75)

Fork Truck & Handling Arm Combination Saves Man-Hours in Sugar Bag Handling

AT Vida Sugars, Inc., Loreauville, Louisiana, one Hyster QN-20 lift truck loads bags of raw sugar into freight cars faster than the plant can produce them.

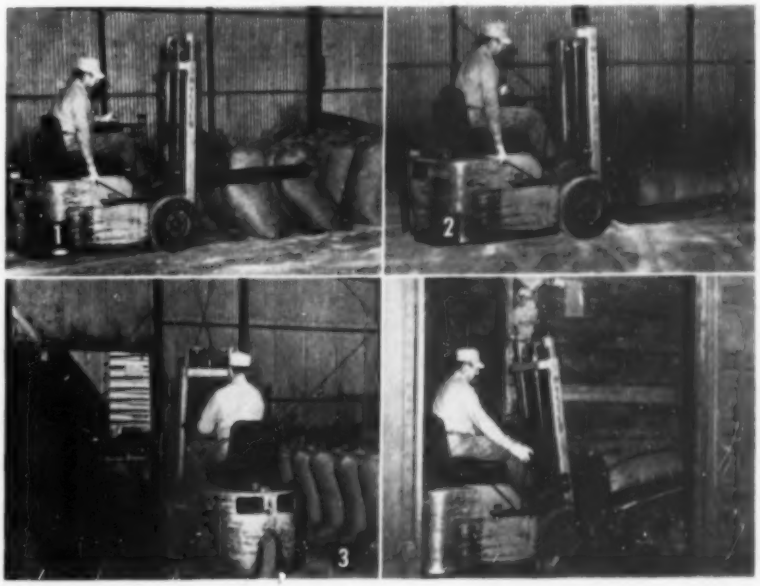
During the crop season the sugar factory produces 600 bags of raw sugar per day with an average weight of 335 lb per bag. A screw conveyor moves the sugar from the processing equipment to the warehouse where the bags are filled and sewed.

Filled bags are then placed in two rows, end up. The lift truck, equipped with Hyster Load-Grab and Hycola bag handling arms, approaches the rows of bags, grabs four lightly near the top and pulls backwards. As the bags fall forward the truck backs off, opens the clamp, moves forward, grabs the first two bags lengthwise, and then hauls them to the car and stacks them six bags across and seven high.

The Hycola Bag Handling Arms are made by Hyster Company of Louisiana. Arms bolt onto standard Load-Grab. Curvature of arms supports bottom of bags as well as applying squeeze.

Because the entire day's production can be loaded in five or six hours, the lift truck is not in operation continuously. Therefore, the driver is free to do other work around the plant while waiting for a quantity of bags.

Before installation of the "20," five men required six hours to load each car of 250 to 300 bags. They could pile them only five high. Now the lift truck can pile them seven high with the result that from 340 to 375 bags are loaded into each car at a rate of 350 bags in three hours. This is a savings of about 48 man-hours per day plus a more efficient utilization of freight car capacity.

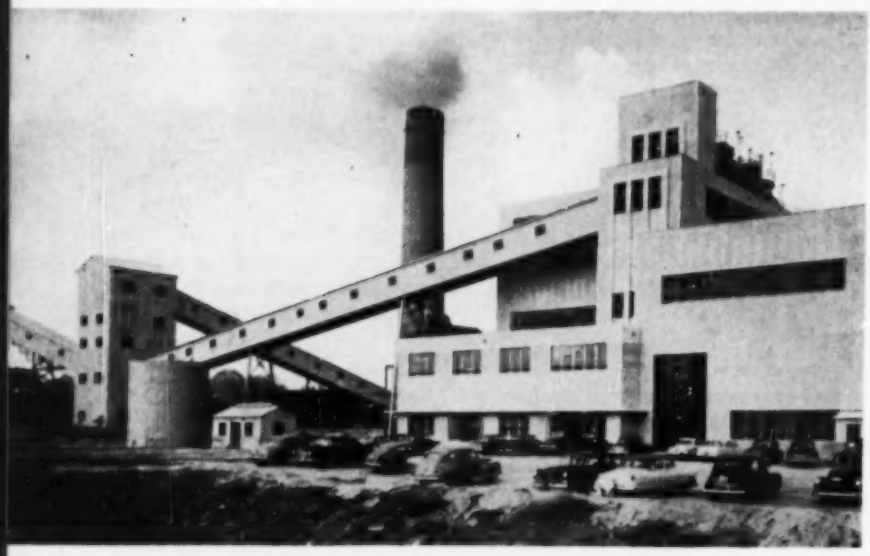


(1) Hyster "20" equipped with a Load-Grab and Hycola Bag Handling Arms, grabs four bags of sugar lightly near the top and pulls backward. As the bags fall forward the truck backs off, opens the clamp, moves forward, and grabs the first two bags lengthwise (2).
(3) Fork truck takes the bags, each weighing 335 lb, into the boxcar and stacks them at a rate of 350 in three hours.

Scholz Steam Plant—Gulf Power Company

By ROLAND HOWELL
Gulf Power Company
Chattahoochee, Florida

SCHOLZ STEAM PLANT, newest generating station of Gulf Power Company, is located four miles southwest of Chattahoochee, Florida on the Apalachicola River. Its first 40,000 kw unit started operation in February 1953, the second 40,000 kw unit began operation in October 1953. Planned ultimate capacity for the station is two 40,000 kw units and two 60,000 kw units.



Turbine Generators

Each turbine is supplied with steam by its own boiler. However, there is a tie between the boilers to enable the operation of either boiler with either turbine.

Electricity is generated at 13,800 volts and is stepped up to 110,000 volts for transmission over five feeders into Gulf Power Company's transmission system which is interconnected with the systems of Florida Power Corporation, Georgia Power Company and Alabama Power Company. The generators are connected to the transformers through oil circuit breakers and a disconnect switch. There is also an oil circuit breaker on the high side of the main transformer.

The two 20 stage turbines are supplied with 850 psi, 890 F steam at full load and exhaust into surface condensers. Steam is extracted from the 4th, 7th, 12th, 15th, and 18th stages for feedwater heating and deaeration.

The voltage of each generator is controlled by an amplidyne motor generator which requires no pilot exciter. The generators are cooled by hydrogen at ½ to 30 psi as required by load conditions.

Condensers

The Apalachicola River supplies cooling water and an adequate supply is available for requirements of the planned ultimate capacity of 200,000 kw.

Condenser cooling water is taken from the intake tunnel, which runs underneath the base slab, by two vertical circulating water pumps located adjacent to each condenser. Experience during the initial year of operation indicates that the range of circulating water temperature will be between 45 and 90 F.

This water has been of such quality that no cleaning of the condenser tubes has been necessary other than periodic backwashing. Backwashing is accomplished by means of four-way reversing valves, and in addition to cleaning the tube it has also eliminated collecting of debris on tube sheets.

Since each condenser is composed of two identical halves, this reversal of flow in one-half at a time is accomplished without excessive loss of vacuum. For these two reasons it has been possible to maintain good vacuum during the year. This water is returned to the river through a discharge tunnel downstream from the intake. Condensate is pumped from the condenser hot wells by one of two condensate pumps per unit and discharged through the inter and after condensers to the extraction feedwater heaters.

Boilers and Auxiliaries

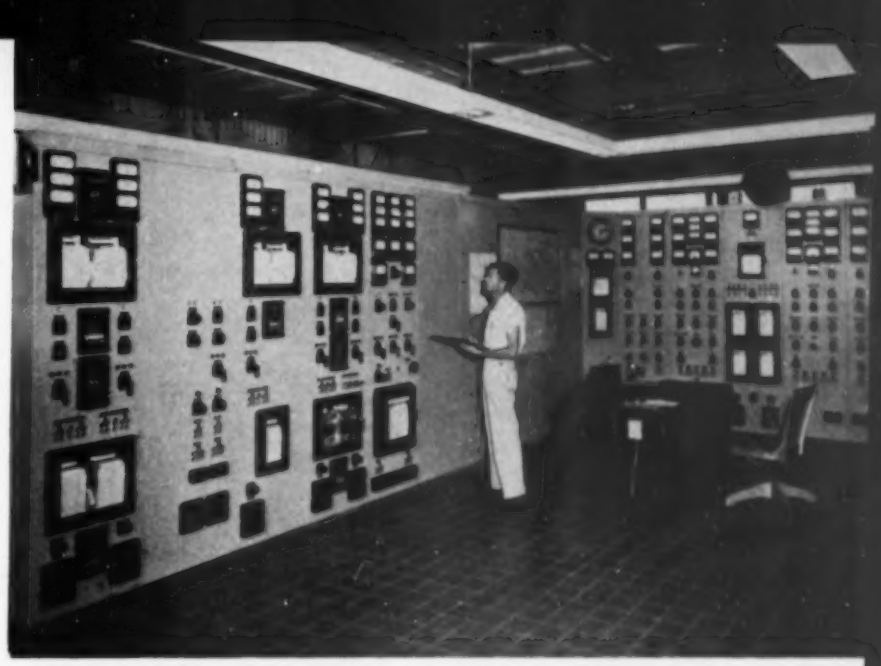
The boilers and most of the auxiliary equipment are located within the power plant building. But the induced draft fans and mechanical velocity type precipitators are located out-of-doors.

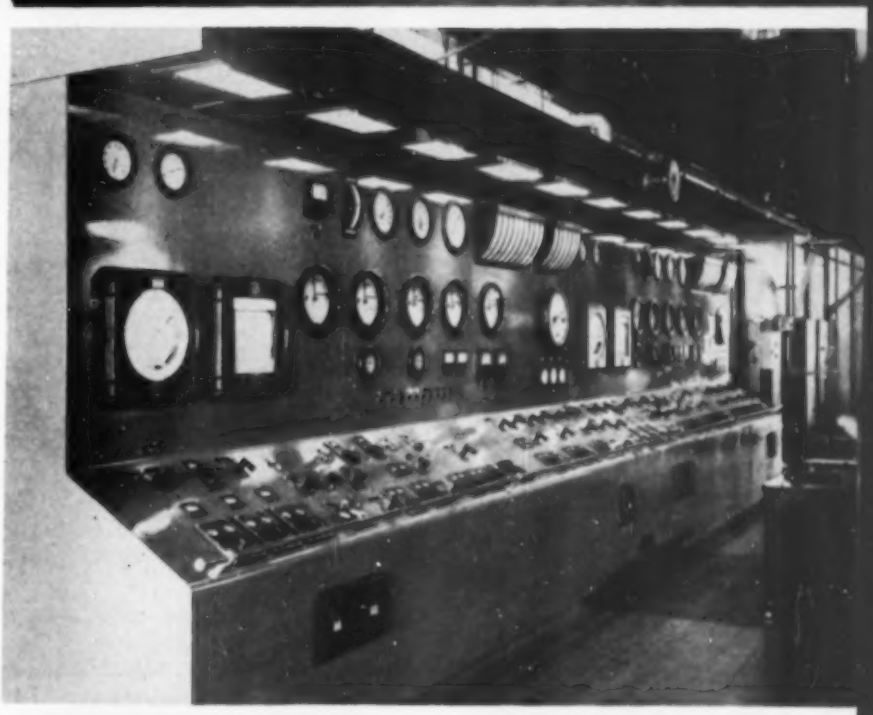
Each boiler has one forced draft fan and one induced draft fan, one precipitator, one air preheater and one continuous tube type economizer. Superheated steam flows through one 12 inch line to the turbine stop valve.

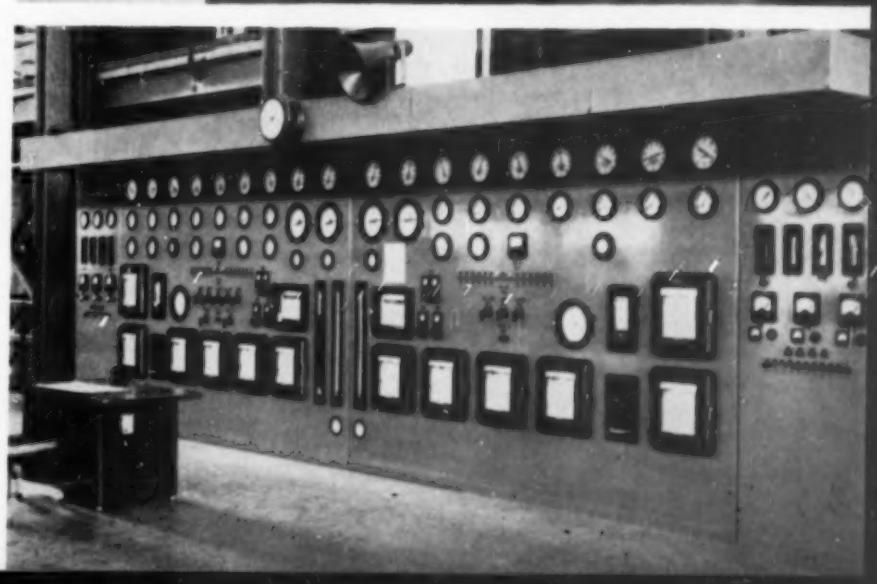
At present the boilers burn pulverized coal but design is such that they can be converted to burn

SWITCHBOARD room at right houses the generator controls, panels, and controls for all major electrical circuits.

BOILER control board (center) and the turbine control board (bottom) are located back-to-back between the boiler and turbine areas. This arrangement may be seen in the picture of the turbine on the next page.







bunker C fuel oil or natural gas. Number 2 fuel oil is used for lighting.

The burners are located in two rows of three burners each on the operating floor elevation in the front of the boiler.

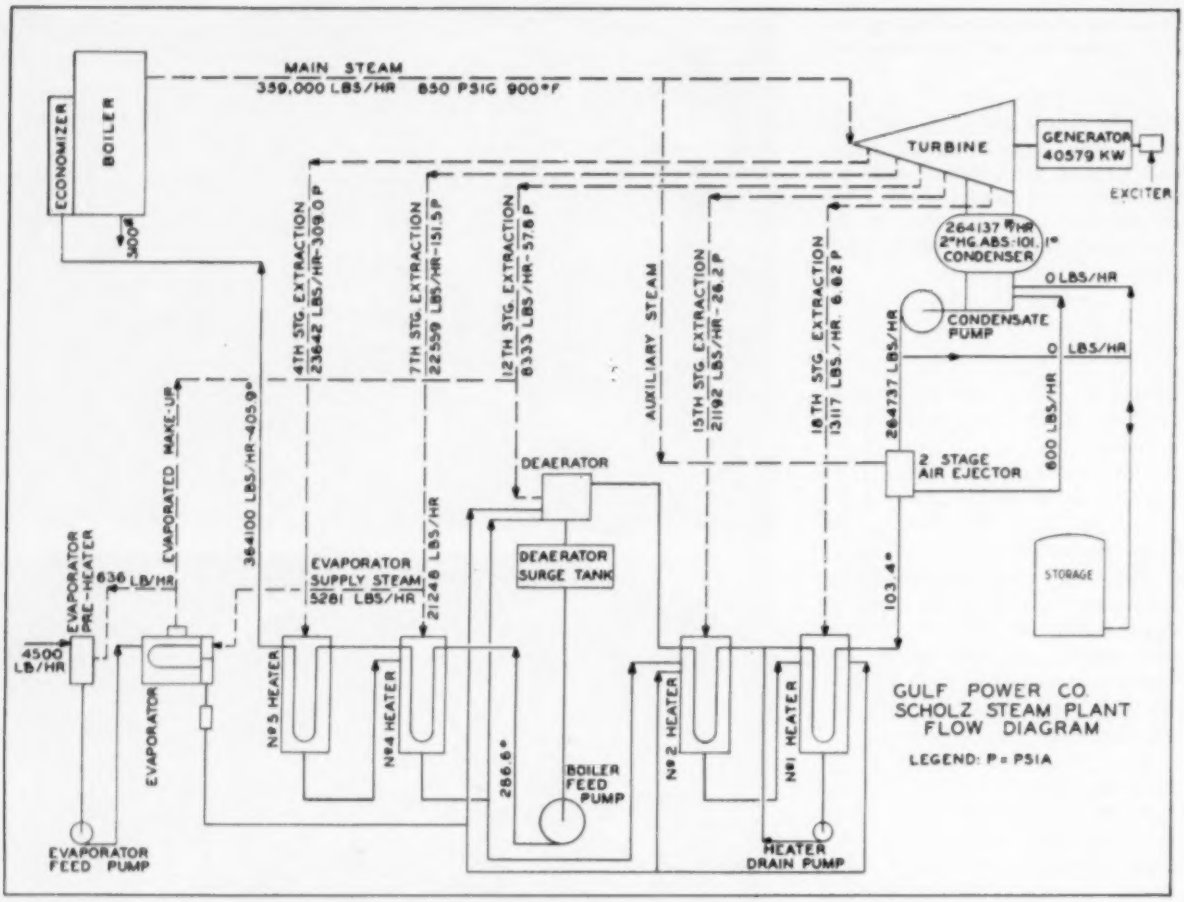
The boiler and turbine control panels are located on the main operating floor between the turbines and boilers with the turbine and boiler control panels back to back. Control panels for No. 1 unit and No. 2 unit are side by side.

Combustion controls are of the electronic type with the induced shaft and forced draft fan speeds being regulated by hydraulic couplings. Furnace pressure is maintained by regulating the speed of the induced draft fan. The air flow control may be operated automatically by either steamflow or fuel ratio. All controls may be operated manually. The boiler firing rate can be controlled automatically by either steam flow with pressure reset or by superheater outlet pressure alone.

Boiler Feedwater

Boiler feedwater makeup is taken from a deep well. This raw water goes directly to the evaporator preheater where caustic soda and disodium phosphate are added for the removal of temporary hardness. The water in the evaporator preheater is heated to approximately 220 F before being pumped into the evaporator. The evaporator blowdown is open continuously. Boiler water treatment is accomplished by shot feeding chemicals into the boiler drum. The boiler blowdown is intermittent for control of silica and total solids.

Each boiler is fed by two 8 stage horizontal split case centrifugal



pumps. Each pump is driven by a synchronous speed squirrel cage induction motor through a flexible coupling. Each pump has a capacity of 1025 gallons per minute at 295 F and 1250 psi. All pumps are designed for constant speed operation. Discharge pressure at full load speed of 3580 rpm is 1250 psi. One pump is normally in service, the second on standby.

The feed control system provides for automatic or manual operation of any combination of the pumps. Normally feedwater control is obtained automatically by a three element feedwater regulator valve. This valve can also be operated remote manually from the boiler panel or by means of a hand wheel on the valve. A bypass valve is installed in parallel with the feedwater regulator valve.

Coal and Ash Handling

Coal in hopper bottom cars is brought from a railroad siding by a diesel-electric locomotive to a car shakeout where it is dumped into a reciprocating feeder, which places the coal on a conveyor belt at a uniform rate. The conveyor belt transports the coal (over a magnetic pulley for tramp iron removal) to a crusher and then either to the power plant building or to the coal pile. Coal on the pile is packed and moved by a bulldozer and a rubber tired tournadozer and is returned to the conveyor via a reclaim hopper.

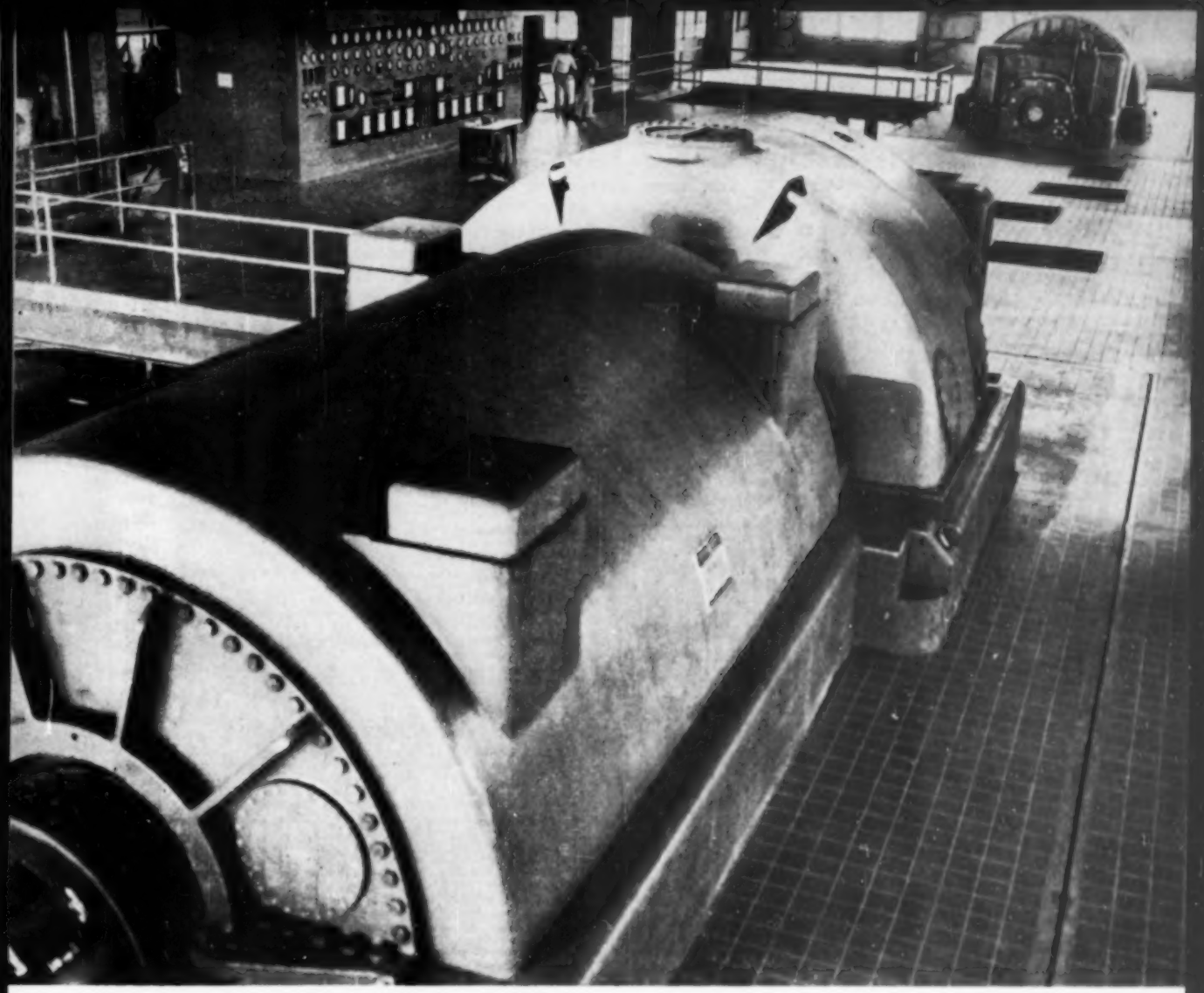
Coal which enters the building is distributed to bunkers by a belt tripper. It is taken from the bunkers in a crushed condition through automatic coal scales to the feeders and then to the pulverizers. Proper quantities of coal are maintained in the pulverizers through the operation of rotating table type feeders. Regulation of the feeder is obtained by variations in mill differential pressure and quantities of air handled by the primary air fans.

Ashes are sluiced from the furnace bottoms into a trench, thence to an ash pit. Removal of ashes from the ash pit and their disposal in the ash pond is accomplished through the use of one of two ash disposal pumps located adjacent to the ash pit inside the building.

A switchboard room houses the

SUPERVISORY PERSONNEL
Scholz Steam Plant

L. E. **Radford**, Plant Superintendent
E. L. **Williamson**, Ass't Plant Superintendent
D. W. **Holt**, Analysis Engineer
H. R. **Courington**, Supervisor
W. J. **Booth**, Supervisor
F. V. **Hunnicutt**, Supervisor
R. W. **Johns**, Supervisor
A. B. **Dodson**, Supervisor



This view shows the arrangement of the turbine generators, with turbine controls back-to-back with those of the boilers.

generator control and switchboard panels. The electrical panels for each unit are located side by side and include the usual meters, switches, and relays. Switches and instruments for the switchboard are also located on panels in this room.

The switchyard has three 110,000 volt buses, one bus for each unit and a transfer bus, to which four transmission lines are connected. In the near future there will be one additional line connected to the 110,000 volt buses.

Station service power is taken from the 13,800 volt bus (low side of the main power transformer). Each unit has its own station service transformer which supplies power at 2400 volts and 575 volts and an additional station service transformer is provided as a spare for either unit. Miscellaneous power and lighting transformers provide power at 208 volts and 110 volts. In the event of a complete loss of station service, power necessary for the operation of essential equipment is provided at 575 volts by means of a gasoline engine driven generator.

Fire Protection

Fixed fog nozzle systems are located in areas where oil fires might occur and also at transfer points on the coal handling system. In addition, hose outlets are located throughout the plant and some outside locations for the use of portable fog nozzles. High pressure water may be supplied to any of these nozzles and outlets by means of either an electric fire pump, which can be started remotely from any of ten push buttons stations, or a gasoline engine driven fire pump both of which are located outside of the building.

Fixed CO_2 systems are installed at strategic locations for the protection of switchgear and other electrical equipment. Portable extinguishers consisting of both CO_2 and CBM types are located throughout the plant.

Design and operational features of the fire protection system were featured in SOUTHERN POWER & IN-

DUSTRY for July, 1954, pages 52-55.

Building and Facilities

The main building is of steel and has gray transite siding. Office space for the plant superintendent, supervisors, and office personnel is located in the office annex in the front of the building which overlooks the Apalachicola River. Also located in the annex are a well equipped laboratory, machine shop, storage space, assembly room, and modern locker-shower rooms.

The largest part of the building houses the boiler firing floor and turbine-generator floor on the same elevation, with no division wall between boilers and turbines. The deaerators, house service water tank, clear water tank, and elevator penthouse are located on the roof.

Performance

Results and performance so far have met expectations and experiences in correcting initial operational difficulties have not been excessive or unusual.

PRINCIPAL EQUIPMENT—Scholz Steam Plant, Gulf Power Company, Chattahoochee, Florida

GENERAL DATA

Name of Station.....Scholz Steam Plant
Station Site.....Five miles southwest of Chattahoochee, Florida.
Total Generating Capacity.....80,000 kw present; 200,000 kw ultimate
Total Boiler Capacity.....850,000 lb/hr
Steam Conditions.....850 psig, 900 F at turbine throttle
Cooling Water Source.....Apalachicola River
Design Engineers.....Southern Services, Inc.

TURBINE GENERATORS

Turbines.....Two—General Electric, 40,000 kw, ASME-AIEE Preferred Standard, 3600 rpm, 26 stage, tandem compound double flow, designed for 2½" mercury backpressure.
Generators.....Two—General Electric, 40,000 kw, ASME-AIEE Preferred Standard, 47,058 kva at .50 psig hydrogen, 1970 amp, 13,800 volts, 3 phase, .85 power factor, direct connected.
Exciters.....Two—General Electric, 250 volt, 145 kw, 3600 rpm, direct connected.
Generator Coolers.....Finned Admiralty tube hydrogen coolers within the stator frame, 6180 sq ft cooling surface per generator.
Turbine Oil Coolers.....Four—Type "EU" Ross oil coolers, "U" tube with 422 sq ft cooling surface each, are installed in reservoir.
Turbine Oil Filters.....Two—Bowser, Inc., capacity 270-540 gph

CONDENSING EQUIPMENT

Condensers.....Two—Elliott Company, two pass, condensing surface 32,500 sq ft, reversible flow, divided water box.
Circulating Water Pumps.....Four—Ingersoll-Rand, vertical 22,500 gpm each. Drive—General Electric, 250 hp 720 rpm, 2,300 volt, 3 phase, squirrel cage induction motor.
Condensate Pumps.....Four—Pennsylvania Pump & Compressor, 3 stage, 650 gpm. Drive—General Electric, 125 hp, 1200 rpm, 2,300 volt, 3 phase, squirrel cage induction motor.
Air Removal Equipment.....Elliott Company — Two priming ejectors. Two steam jet inter and after condensers.
Expansion Joints.....U. S. Rubber Company—circulating water rubber expansion joints. Badger Manufacturing Company—condensate pump suction expansion joints.

SWITCHBOARD EQUIPMENT

Switchboard and Panels.....Assembled and wired by Clement Electric Company; field erection by Fishback & Moore, Inc. Voltmeters, ammeters, synchroscope, relays, voltage regulator, and other miscellaneous instruments by General Electric Company. Indicating frequency meters and load indication by Weston Electrical Instrument Corp. Recording frequency meters and recording watt and varmeters by Esterline Angus Company, Inc. Transformer temperature recorder by Leeds & Northrup Company. System voltage recorder by The Bristol Company.

STEAM GENERATING EQUIPMENT

Boilers.....Two—Babcock & Wilcox Company, single drum radiant type with water wall furnace. Heating surface of boiler and walls 8,343 sq ft. Heating surface of superheater 11,990. Capacity 425,000 lb/hr each, design pressure 1046 psig, 900 F.
Economizers.....Continuous counter flow 18,279 sq ft heating surface each.
Air Heaters.....Two—The Air Preheater Corp., Ljungstrom regenerative, 37,300 sq ft heating surface.
Soot Blowers.....Diamond Power Specialty Corp. Superheater blowers use saturated steam and are operated by air drive motors. Economizer and boiler blowers use saturated steam and are manually operated. Air preheater blower uses superheated steam and is actuated by an electric motor.
Blow-Off Valves.....Hancock; Manning, Maxwell & Moore, Inc.
Water Columns.....Diamond Power Specialty Corp. Diamond Bicolor gauge. Yarhall-Waring Company remote level indicator and Yarway sight glass.
Safety Valves.....Crosby Steam Gage & Valve Co., nozzle type.
Chemical Feed Pump.....One—Worthington Corporation
Burners.....Twelve—Babcock & Wilcox Co., circular type.
Superheater Temperature Controls.....Bailey Meter Co., remote manually controlled dampers.
Combustion Controls.....Republic Flow Meters Company—electronic type.

COAL HANDLING EQUIPMENT

Coal Conveyors.....Jeffrey Manufacturing Company—Two 36" belts, capacity 350 tons per hour; three 30" belts, capacity 350 tons per hour.
Automatic Scales.....Six—Stock Equipment Company, 15 tons per hour, 300 lb unit capacity weigh hopper.
Railroad Track Scales.....One—Fairbanks, Morse & Company, 300,000 lb capacity.
Tractors.....One—Caterpillar Tractor Company—Diesel D-8 crawler tractor with bulldozer; one—R. G. LeTourneau, Inc. Model Super C, rubber tired, Tournadozer with 18 ton carryall.
Vibrators.....Syntron Electric Company
Crushers.....One—Pennsylvania Crusher Company, slow speed ring type granular, 400 tons per hour capacity. Drive—General Electric, 200 hp, 720 rpm 2300 volt, 3 phase, squirrel cage motor.
Coal Sampler.....One — Geary-Jennings 36" chain driven, automatic.
Coal Shakeout.....One—Allis-Chalmers Mfg. Co.
Pulverizers.....Six—Babcock & Wilcox Co. ball type pulverizers, capacity 8 tons per hour.
Feeders.....Six—Babcock & Wilcox Co. rotating type table feeders, driven by a two speed motor.

DRAFT EQUIPMENT

Forced Draft Fans.....Two—Sturtevant Div., Westinghouse Electric Corp., 167,500 cfm at 140 F at 12.5" water pressure. Speed controlled through American Blower Corp. fluid drive. Drive—General Electric Company, 400 hp squirrel cage motor.
Induced Draft Fan.....Two — Sturtevant Div., Westinghouse Electric Corp., 255,000 cfm at 340 F and a negative static pressure of 15.5 inches of water. Speed controlled through American Blower Corp. fluid drive. Drive—General Electric Company, 900 hp squirrel cage motor.
Chimney.....One—Rust Engineering Company—150 ft high with 13'6" top inside diameter, radial brick.
Breeching and Ducts.....R. D. Cole Manufacturing Company.
Draft Gages.....Republic Flow Meters Company.

BOILER FEEDWATER EQUIPMENT

Boiler Feed Pumps.....Four — Ingersoll-Rand, horizontal split casing diffusor type centrifugal, 1025 gpm capacity at 3570 rpm with 2795 ft head. Drive—General Electric Company, 900 hp squirrel cage induction motor connected by a Fast's coupling.
Extraction Heaters.....Eight — Westinghouse Electric Corp. Two—vertical, fourth stage, 2 pass U-tube, 1140 sq ft. Two—vertical, seventh stage, 2 pass, U-tube, 1330 sq ft. Two—vertical, fifteenth stage, 2 pass, U-type, 1320 sq ft. Two—vertical, eighteenth stage, 2 pass, U-tube, 1450 sq ft.
Deaerating Heaters.....Four—Elliott Company. Two-feedwater, 425,000 lb/hr each. Two—evaporator preheater, 15,000 lb/hr.

Feedwater Regulators ..... Two—Republic Flow Meters Company, three element feedwater regulator system. Maximum flow 1625 gpm at 415 F and 2,795 ft head.

Feedwater Regulator By-Pass ... The Swartwout Company.

Evaporator ..... Two—Westinghouse Electric Corp., horizontal bowed tube, submerged bundle, 400 sq ft, 15,000 lb/hr.

ASH HANDLING EQUIPMENT

Ash Hoppers ..... Allen-Sherman-Hoff Company.

Sluicing Equipment ..... Allen-Sherman-Hoff Company.

Fly Ash Removal ..... Allen-Sherman-Hoff Company, Hydrovac System.

Fly Ash Precipitators ..... American Blower Corp., mechanical velocity type.

PIPE AND PIPE COVERING

Piping Contractor ..... Grinnell Company, Inc.

Check Valves ..... The Chapman Valve Mfg. Company; Hancock; Manning, Maxwell & Moore, Inc.; Edward Valves, Inc.

Gate & Globe Valves ..... The Chapman Valve Mfg. Company; Hancock; Manning, Maxwell & Moore, Inc.; Edward Valves, Inc.

Pressure Reducing Valves ..... Fisher Governor Company.

Small Valves ..... The Chapman Valve Mfg. Company; Edward Valves, Inc.; Crane Company; Hancock; Manning, Maxwell & Moore, Inc.

Reverse Flow Valves ..... Elliott Company.

Relief Valves ..... Manning, Maxwell & Moore, Inc; Consolidated.

Traps ..... Armstrong Machine Works.

Expansion Joints ..... Badger Mfg. Co., copper; U. S. Rubber Company, rubber.

Pipe Covering Contractor ..... The Brooks-Fisher Insulating Company.

Pipe Covering Material ..... High temperature or 85% magnesia, canvas covered.

INSTRUMENTS

Steam Flow Meters ..... Two—Republic Flow Meters Company, electric type.

Feedwater Flow Meters ..... Two—Republic Flow Meters Company, electric type.

Condensate Flow Meters ..... Two—Republic Flow Meters Company, electric type.

Pressure Gages ..... Ashcroft; Manning, Maxwell & Moore, Inc., indicating. Republic Flow Meters Company, recording.

Vacuum Gages ..... Ashcroft; Manning, Maxwell & Moore, Inc., indicating. Republic Flow Meters Company, recording.

Mercury Columns ..... Manning, Maxwell & Moore, Inc.

Thermometers ..... Manning, Maxwell & Moore, Inc.; American, indicating; Leeds & Northrup Company, recording.

CO_2 Recorders ..... Leeds & Northrup Company.

Barometers ..... American; Manning, Maxwell & Moore, Inc.

ELECTRICAL EQUIPMENT

Switchyard Structures ..... Erected by Fischbach & Moore, Inc.

Main Transformers ..... Two—Westinghouse Electric Corp., 45,000 kva, 3 phase, 13,800 and 110,000 volt.

Auxiliary Transformers ..... Three—General Electric Company, 3 phase, 13,800 to 2,300 and 575 volt; Three—Maloney Electric Company, 3 phase, 575 to 208 volt.

Oil Circuit Breakers & Disconnect Switches ..... Westinghouse Electric Corp.; Allis-Chalmers Mfg. Co.

Switchgear ..... General Electric Company; I.T.E. Circuit Breaker Company.

CO_2 Fire Protection Equipment ... C-O-Two Fire Equipment Company.

Storage Battery ..... The Electric Storage Battery Company, Exide Manchex.

Battery Charger ..... The Electric Products Company, 140-128 volts, 5 kw.

Emergency Generator ..... U. S. Motors Corp., 600 volt, 80.2 amp, 3 phase, gasoline engine driven.

MISCELLANEOUS

Pumps ..... Ingersoll-Rand — Two cooling water, 1,000 gpm each; two house service, 1250 gpm each; two ash sluice, 1250 gpm each; one screen wash water, 750 gpm. Two—Worthington Corporation heater drain pumps, 95 gpm each.

Air Compressors ..... Two — Chicago Pneumatic Tool Company.

Boiler Room Hoist ..... One—Shepard Niles Crane & Hoist Company, 10 ton, hand racked, motor driven monorail hoist.

Turbine Room Crane ..... One—Whiting Corp. main hoist, 100 tons; auxiliary hoist 15 tons; span 59 ft.

Motor Drive Couplings ..... Fast's; Koppers Company, Inc.

Derrick ..... Link-Belt Company, crawler crane, 62 ft boom.

Plant Phone System ..... Radio Corporation of America public address system; Stromberg-Carlson ring type telephone.

Sound Proof Booths ..... Burgess-Manning Company.

Traveling Intake Screens ..... Three—Link-Belt Company, 70,000 gpm each.

Vacuum Cleaning System ..... United States Hoffman Machinery Corp.

Tanks ..... R. D. Cole Manufacturing Company. One house service water, 30,000 gallon; one condensate storage, 60,000 gallon; one lighter oil storage, 15,000 gallon; one turbine oil storage, 6,000 gallon; one clear water storage, 10,000 gallon. General Steel Tank Company supplied blow off, gland seal, and chemical feed tanks.

CONTRACTORS

General Contractor ..... Gulf Power Company.

Excavation and Concrete ..... Standard Construction Company.

Siding ..... Bernard & Byrd, Inc.

Piping ..... Grinnell Company

Insulation ..... The Brooks-Fisher Insulating Company.

Electrical ..... Fischbach & Moore, Inc.

Industrial Use of Isotopes

(*Starts page* 66)

taining slag. This replaces the old cut-and-try methods which were slow, expensive and uncertain.

Food Industry

The preservation of foods by means of radioactive isotopes is probably one of the most exciting applications of these versatile tools. Food sterilization by exposure to radiations is the subject of intensive research in this country and abroad. Present indications are that heat-sensitive food products can be sterilized in the container with a negligible rise in temperature. Furthermore sterilization can be accomplished on a production-line basis in the field.

Although the flavor and color of some products appear to be changed there are a host of others which retain their original flavor and appearance for months, and even years, after radiation. Meats can be kept at their original freshness for years without any refrigeration. Many fruits and vegetables retain the flavor of garden-ripened products for months. Cereals and grains can be kept free of spoilage for indefinite periods of time.

One has only to recall the effect of quick-freezing on stabilizing the citrus fruit market to imagine the potentialities of radiating other food products.

The applications of radioactive isotopes in the chemical industry are almost limitless. Radioactive isotopes may be used as tracers to determine the effect of catalysts and chemical reagents on the efficiency and speed of various processes. Tedious and expensive chemical analysis may be eliminated by simply introducing an isotope of the normal chemical element. The isotope can then be traced through the process and its concentration in the final product can be immediately determined. The use of tracers has clearly pointed the way to economies in the use of chemicals and has indicated possible means for speeding processes. Furthermore the use of radioactive isotopes having a short half-life permits continuous quality control without the danger of passing on radioactive products to the consumer.

(*Continued on page* 77)

Handling and recovery methods . .

Volatile Solvents

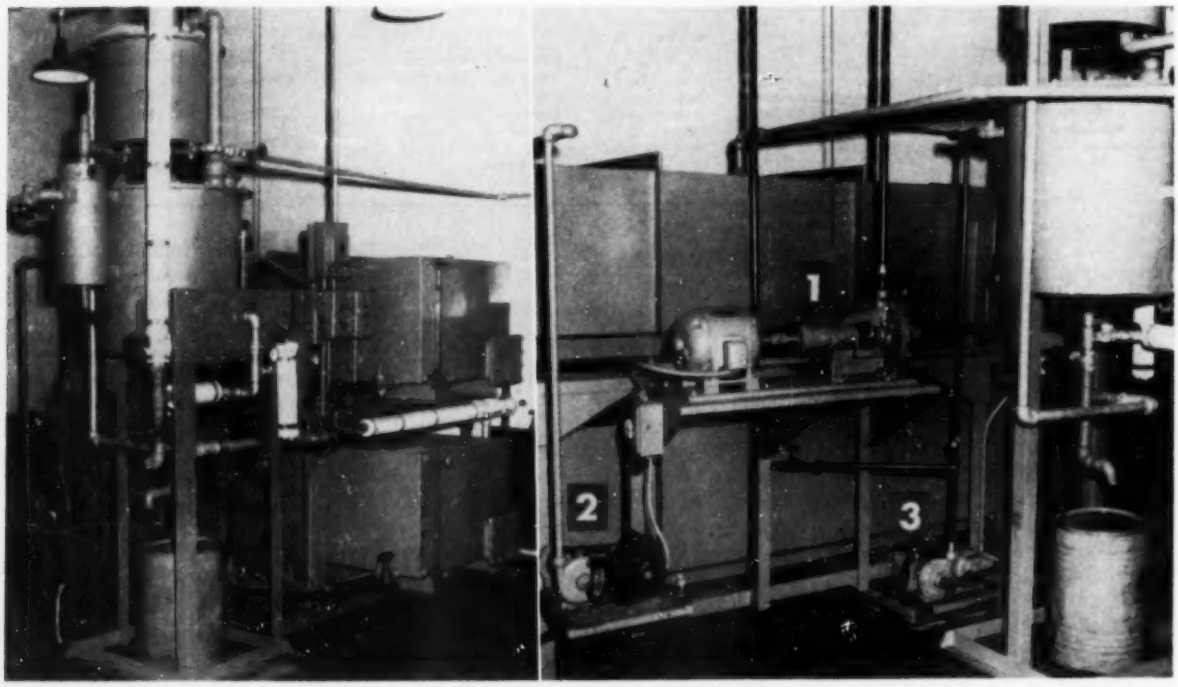
By J. L. FINNEY
Supt. of Maintenance
Anniston Tube Plant
General Electric Co.
Anniston, Alabama

ONE OF the most commonly used solvents for degreasing metals is trichlorethylene. It is essential that this solvent be used with adequate ventilation. Plant personnel must avoid breathing the vapors and contact with the skin.

Degreasing units are usually supplied with a solvent storage tank as an integral part of the unit. When it is necessary to clean out the degreasing chamber, the solvent is pumped into the storage tank. Make-up solvent is added at the storage tank. When the solvent is used until it is necessary to replace completely with new solvent, the dirty solvent has to be pumped into drums and transported to a storage area or shipped directly to a solvent recovery still.

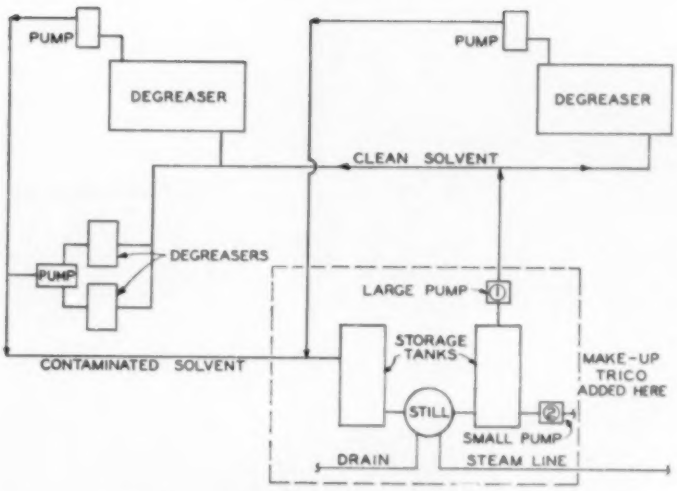
The Anniston Tube Plant of the General Electric Co. has in operation a system that has proved to be highly efficient. It consists of two large solvent storage tanks, a still for recovery of the used solvent and necessary pumps, piping drains and a steam supply to operate the still. This equipment is located in a room completely removed from the main manufacturing area.

Advantages of the system include: Release of floor space in manufacturing area, reduction in labor cost, immediate recovery of contaminated solvent, faster and more frequent degreaser solvent changes, and elimination of floor maintenance cost caused by spilling of solvent when changed using the old method. Handling of solvent in drums completely elimi-



COMPLETE STILL and two storage tanks. Top tank is used for clean solvent storage and the bottom tank for contaminated solvent storage. Vertical cylindrical units in the still with residue container on floor underneath. Equipment in the Anniston Tube Plant is in a room completely removed from the manufacturing area.

PUMPS are shown at the right. Large pump (1) pumps clean solvent back to the degreasers. Small pump (2) pumps make-up solvent directly into clean solvent storage tank. Make-up solvent is new and received in drums and no distillation is necessary. Small pump (3) pumps contaminated solvent from storage tank into the still.



Line Diagram of Handling and Recovery System

nated except the small quantity required for make-up. Note diagram of the complete system.

Standard installation methods are used throughout. All system piping has welded joints wherever possible.

The storage tanks are of ample capacity to take care of all degreaser units in the system.

Residue obtained from distillation is removed from the bottom of the still. It has been noted that when frequent changing of solvent is practical with this system a high percentage of residue is removed from the degreaser chamber and deposited in the still where it can be easily disposed. This is another important advantage of the system and results in longer periods between taking a degreaser out of service and cleaning out the chambers.

Isotopes in Industry

(*Starts page* 66)

In both the chemical and paper industries there is a need for a gauge which will continuously measure and control the thickness of thin sheets such as tissue paper, plastics, and glue coated paper. A contact micrometer or rider pressing on the surface of these materials is impractical.

Instruments are available which measure the weight of the sheet per unit area. The sheet acts as partial absorber of radiations and its absorption power is very nearly a logarithmic function of weight per unit area regardless of the substance. Instead of a Geiger counter, an ionization chamber is used with the ionization current measured by an ammeter. The sheet is passed between a source of beta radiation and the ionization chamber and after calibration the ionization current will indicate the weight per unit area or thickness of the sheet.

Miscellaneous Applications

There are many uses of radioactive isotopes which are of interest to industry in general. A number of instruments are available which utilize radioactive isotopes to indicate and control the liquid level in sealed tanks. For example, the level of molten steel in a cupola can be found by means of a source of gamma rays such as cobalt-60. Since the liquid absorbs more of the gamma rays than the unfilled volume, the level is clearly indicated. A variation of the liquid level gauge is the package inspector which provides automatic inspection of cans and other opaque containers to determine if they are propery filled.

Pipes, boiler tubes, heavy castings and all types of welds which would normally require high-powered and expensive X-ray equipment may be continuously examined for flaws with comparatively inexpensive and easily transportable radioactive isotopes. A further advantage is that the isotopes may be used in places which would be inaccessible to high-voltage X-ray tubes.

Wear may be accurately gauged by simply incorporating a radioactive isotope in the material to be tested. One example is the measurement of tire wear. As the tire wears, the radioactive source gradually disappears and the source of radiations becomes weaker. A Geiger counter gives a rapid measure of the rate of wear. An alternate method is to expose X-ray film to the road over which the radioactive tire has passed.

Among the other uses of isotopes of particular interest to smaller industries are the activations of phosphors for outdoor advertising, luminous road signs, and house numbers; eliminators for static electricity; and starters for fluorescent-lighting tubes which start more rapidly because the gas in the tube is always ionized.

Finally, although it cannot be strictly classified as an industrial application of radioactive isotopes, there is the possible use of isotopes in the purification of water and the decontamination of sewage. Even though cities and towns are primarily interested in this application there are a number of industries where cheap methods of water purification and sewage decontamination would result in substantial annual savings.

Conclusion

Only a brief summary of some of the most promising uses of radioactive isotopes which have gone beyond the point of conjecture could be given here. There are many refinements of equipment to be made and the use of isotopes is far from being a panacea for all of our problems. Nevertheless, there are many new applications to be discovered and many old ones to be extended.

FLASH PHOTO records a temporary tool board used during a special maintenance project. The turbine specialist liked the idea and suggested that it be circulated to other company plants.

How Photography Aids Maintenance

Photographs are recognized as essential in technical articles. They are equally important for plant records and reports.

By **S. L. TERRY, Engineer**
and
B. LILLY, JR., Photographer
Southwestern Public Service Company
Amarillo, Texas

THE USE of photography in connection with the maintenance of power plant equipment in the Southwestern Public Service Company, was not adopted as a specific addition to our maintenance program, but rather was developed more by a process of evolution. The occasional pictures which we included in reports of unusual equipment conditions or machine failures began to point out the need for other applications of accurate, detailed photography in maintenance reports.

Pictures are now extensively used in reports and maintenance records of overhauls on heavy equipment, such as steam turbines, generators, large centrifugal pumps, etc. Such equipment may only be opened for inspection once in three years, and at this time it is generally the practice to compare current findings with the records of previous overhauls.

Such comparisons are more easily and accurately made if pictures are a part of the records. These pictures, if correctly photographed, permit us to follow attack by cavitation in pumps, erosion in turbines, commutator wear, and other conditions too numerous or too time consuming to accurately record by methods other than photographic. A ruler or steel scale placed on a part to be photographed is a common method of making such records more easily comparable with later findings.

While the major plant use of photographs is in reporting and recording equipment conditions, we find that they are often helpful in planning heavy maintenance and much time can be saved by their use. When a job includes considerable rigging or difficult scaffolding, reference pictures of previous procedures prove time saving. Such reference pictures occasionally show up a safety hazard which is best removed, and at other times

they indicate improvements which can be made over previous procedures.

More and More Uses

Since photography has been made available to our maintenance personnel, miscellaneous applications are constantly showing up. In one case, accurate measurements were made on a generator collector ring when it was not possible to shut the machine down. A picture was taken of the ring in profile with a steel rule in the same focal plane. Measurements taken from this picture were the basis for planning a maintenance job when a shut-down could be scheduled. Other miscellaneous uses of photography have shown definite pay-offs on several occasions.

Pictures illustrating an unusual spalling of furnace walls, wearing of a gear, wire drawing in a pump case, etc., may be sent to manufacturers, fellow engineers or maintenance people, and bring in comments that result in uncovering the solution to a problem. Similar pictures showing a new method of finding condenser leaks, cleaning extraction tube bundles, storing spare parts, etc., are quite often passed on to other plants having an interest in such procedures.

If photography is to become a real aid in the maintenance program, it is essential that each picture be a clear, concise record of the machine detail or maintenance procedure.

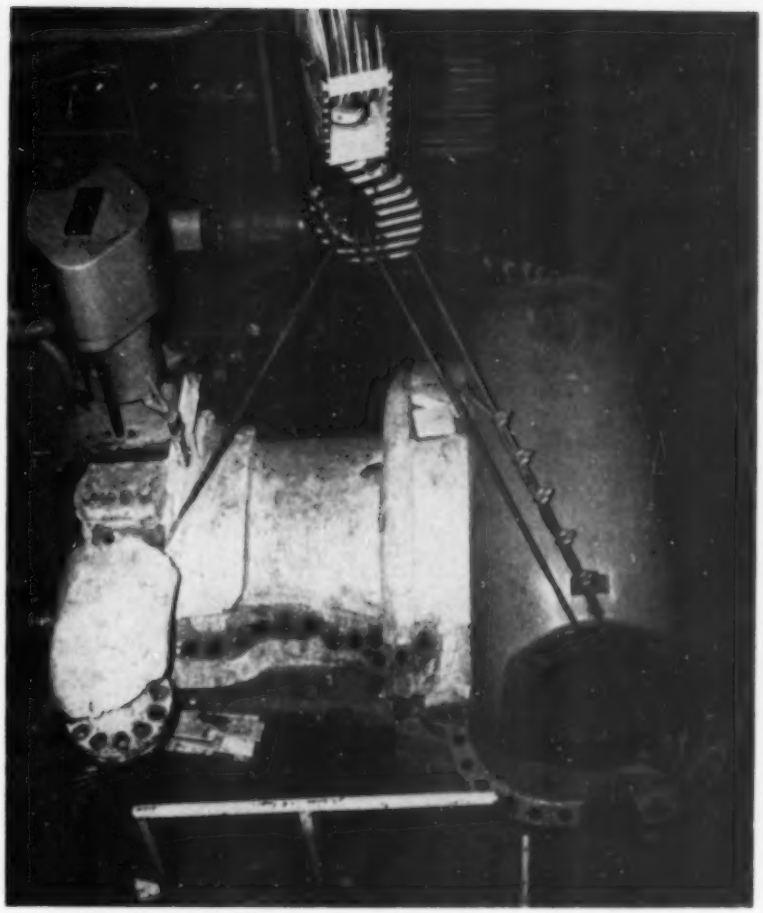
The sole purpose of the photographs is to complete the report's description of conditions of various elements of the unit and its auxiliaries. They must, as nearly as possible, represent an actual viewing of the subject. The technique we follow to obtain these pictures differs slightly from normal black and white procedure.

The Procedure

To fulfill the purpose, the negative must render correct contrast, minute detail, and exact texture of metallic subjects pictured from distances ranging from a matter of inches to several feet.

As in all photography, lighting is the prime factor, but we have found that in this slightly specialized type of photography light alone will not meet the necessary requirements. A fixed focus camera and sunlight would likely be unsatisfactory. Our photographic equipment and technique assures us of getting the picture we need while at the same time causing the least possible delay on the maintenance work.

Others may have methods which render the same results we get, but our technique, developed over four years of trial and error, gives us positive assurance that we are getting the subject recorded as required.



THIS FLASH photograph with 4x5 Speed Graphic, standard lens, will expedite the rigging job on the next overhaul.

The Camera

Our camera is a 4x5 Speed Graphic mounted on a tripod and used as a view camera. The first requirement in photographic equipment for this purpose should be a camera which can be employed as a view camera.

The view camera offers three necessary benefits to get the picture you need. First, the view camera can be positioned to photograph exactly the portion you desire while filling the negative. Second, the most exacting focus can be done through the ground glass. Third, it permits you to stop-down the aperture and check the depth of field to ascertain that your focus is sharp over enough area to make the picture carry the whole story.

When we began this photographic work, the standard lens on our camera (Kodak Etkar F 4/7) was used and found to be satisfactory for most pictures. We learned to adapt the use of this lens to fit most requirements either in close-ups or distance shots.

During the last year, we have

Photo records of this crack show that it has been present for 3 years without causing any complications. Prints may eventually be used to develop a repair procedure. Lens used was the Commercial Etkar with one light high.

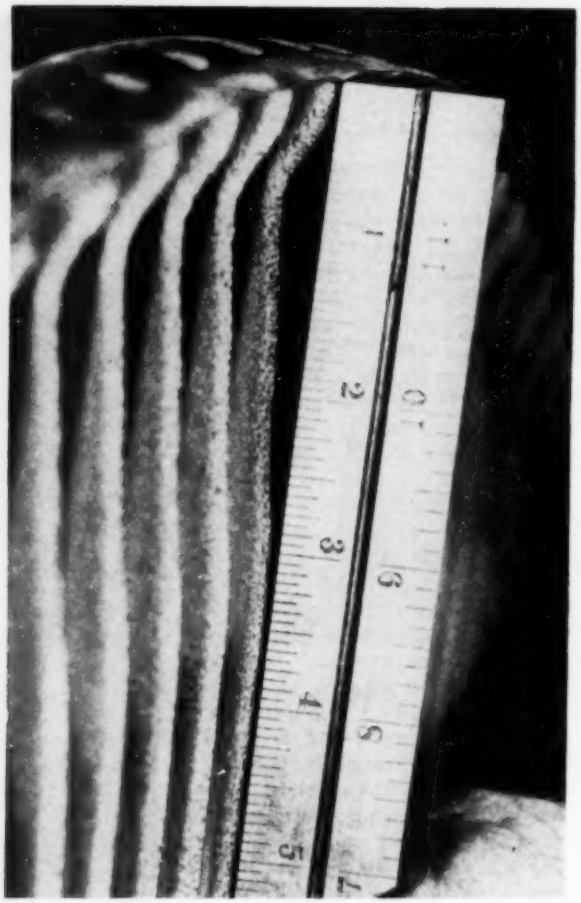


Photo shows erosion of steam turbine blades. Photographic records of the same wheel from year-to-year show progress of the erosion. Close-up detail was obtained with the Commercial Etkar at 30" using one lamp.

had available an 8½" Commercial Etkar lens. Aside from extreme close-ups the 8½" has become our most used lens. The increase in magnification with the larger lens permits us to move back from the subject and fill the negative which at the same time increases the depth of field. The large image on the negative permits 8x10 enlargements without excessive grain.

This lens is particularly favorable when you wish close-ups of subjects where equipment will not allow you to move the camera close. Also, being able to move your camera back permits more favorable positioning of lights to give a better light spread over the subject.

For extreme close-ups, where equipment permits, the standard lens gives good detail of minute machine parts. It is also preferable in cramped quarters and limited viewing areas.

Lights

Our lighting is RFL2 photo reflector floods. We use two on stands and a third free with clamp. Normally all three are employed with the stand lamps on either side of the camera and the free lamp clamped to the tripod.

For example, picturing a 7′ machine part with the large lens, place the stand lamps on either side of the camera lighting the edges of the part. The free lamp on the tripod will light the center area, and because of the distance from camera to subject the spread of the light gives even illumination over the entire subject.

Lamp nearness to the subject adds to the possibility of "hot-spotting" an area rendering the contrast too great for best reproduction. Whereas, if there is greater distance from the subjects to the lamp, the light spread covers a larger picturing area. We have found that even for extreme close-ups two lamps should be used, if possible, to eliminate "hot-spotting."

It would be easy and relatively inexpensive to put all three lamps on stands, however, we find the free lamp suitable for lighting subjects where one lamp provides sufficient light; and the clamp permits positioning of the lamp where stands could not be used.

Exposure

Of course, a reliable light meter

(*Continued on page* 141)

SOME sections of this water header had never been maintained, and consequently are very thin. There was a large hole in the top of the pipe and also about 20 holes below the water level of the pipe which normally runs half full. This once-rusted section can now support the weight of a man.

Texas Plant Avoids Expensive Pipe Replacement

REPAIRS MADE WITH POLYESTER RESIN

A RECENT example of the versatility of Celanese polyester resin in the maintenance of plant equipment was the repair of a water header at the Bishop, Texas, plant of Celanese Corporation of America.

Approximately 40 lineal feet of the header pipe had eroded, with large holes in some areas and the balance of the pipe rusted almost paper thin. There were about 20 holes below the water level of the pipe, which normally runs half full.

The repair procedure used was as simple as it was effective. First, scale was knocked off and two plies of glass cloth, saturated with a self-curing blend of Celanese MR-28C Resin, were applied over the large holes and smaller leaks were plugged. Two additional plies of glass cloth, thoroughly saturated with the resin, were then wrapped about the entire rusted pipe, one at a time.

Cost

Just 30 gallons of resin were required and total material costs amounted to only $137.88. It was, of course, unnecessary to remove the multiple connections or the pipe itself. Thus, many costly man-hours, that would normally be required if the section were replaced, were avoided.

Strength

The reinforced Celanese polyester laminate has ample strength to carry the weight of a man standing over the completely rusted-through section of the header. The laminate will not rust or rot and its moisture absorption is less than half of 1%. Experience indicates that long, trouble-free service can be expected. But in the event that accidental rupture occurs, it is only necessary to apply additional laminate to the damaged area.

Plant-tested maintenance technique . .

Grooving Electrodes Prepare Surface for

Build-Up that Saves Crusher Rolls

WHEN the cost of replacing a cast iron crusher roll is between $4,500 and $6,000, it is obvious that any method of repair which would eliminate this costly replacement is worthy of close examination.

A method still in use in many sugar mills is to re-cut the entire roll in order to form new teeth at the low spots. This is a highly expensive method which can rarely be used more than twice in the service life of a roller. There are definite dimensional limits which cannot be exceeded and when the limit has been reached the roll must be scrapped. But new welding alloys and the latest procedures extend the service life of these rollers and permit a rapid, relatively inexpensive repair to be made.

The mill rolls become chipped and teeth get broken by coupling pins and other foreign matter passing between the rolls with the sugar cane. When this damage interferes with the efficient functioning of the rollers, repair or replacement is necessary.

If the damage is extensive the entire roll should be cleaned of bagasse, washed with a hose and dried by means of oxy-acetylene torches. When the damage is confined to a single area the cleaning operation may be restricted to the damaged section. Areas in the vicinity of the damage are protected from the weld spatter by painting with Eutecto-Mask.

Surface Preparation

These rolls become impregnated with cane juice. It is necessary, therefore, to remove about ⅛-in. of metal before starting to weld. If this precaution is not observed the welds will be porous and the bonds weak.

An efficient method of removing this metal and preparing the surfaces for welding is with ChamferTrode, an oxygenless grooving electrode. This electrode consists of a heavily coated core wire so formulated that the coating is reduced more slowly than the core. This forms a crater through which the arc is concentrated and directed. The coating, after the crater has formed, prevents the core itself from coming in actual contact with the base metal. Therefore, the electrode can be held in contact with the base metal and pushed along its surface. The coating is electrically conductive, to a slight extent, and this gives a delayed action to the arc, after the crater has been formed.

In operation, the arc is struck and promptly extinguished. This forms the crater. The electrode may then be aligned with the shield raised. A light sparking will be seen and this is the signal to lower the shield. The operator has plenty of time to align the electrode and lower his shield before the arc begins. This is a great advantage where accuracy is essential.

When removing unwanted metal, the machine should be set at 300 to 400 amperes straight polarity, and the ChamferTrode held nearly horizontal to the surface of the metal to be removed. When the arc is struck the electrode is pushed steadily in the desired direction and the unwanted metal is virtually blasted from its path.

The groove will be proportionate to the diameter of the electrode used. When larger areas have to be removed, parallel grooves should be made and a third chamfer made in the center where the grooves meet. The heat is confined to the immediate vicinity of the groove so that the remainder of the casting remains relatively cool. The groove itself is clean, bright and an ideal base for welding. If the contour does not conform to the desired specifications and if further preparation is considered necessary, a portable grinder may be used to complete the preparation.

Welding Procedure

Cast iron can be welded "cold" but if the chill is removed from the metal, welding will be easier, the filler metal will have better flow characteristics and superior welds will result. Heating may be done with an oxyacetylene torch with the flame set at excess oxygen.

The accompanying photographs show the actual steps in the repair procedure now employed in many sugar mills.

The layer of juice impregnated metal was removed with ChamferTrode and the machine reset at 120 amperes d-c reverse polarity for a 5/32 in. electrode. Xyron 2-24 rod was inserted into the holder and a weaving technique was used to deposit beads not more than 2 in. in length. The electrode was held at an angle of 15 degrees from the vertical in the direction of travel.

Deposits were peened lightly

after each pass and the slag removed by wire brushing. Peening is absolutely essential in this operation to expand the surfaces and thus remove residual stresses.

Sections were built up approximately 1 16 in. above required dimensions to allow for machining.

The technique of skip-welding was employed to prevent an undesirable build-up of heat locally.

This method of repairing sugar mill rolls has been adopted as standard procedure by many mills. The service life of the rolls can be extended indefinitely because it is possible to rebuild the teeth time after time.

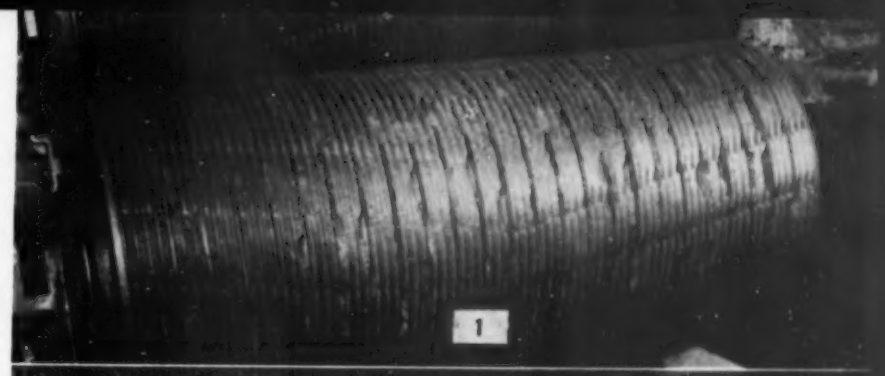
Fig. 1 The bottom roller is badly in need of repair. Whole segments have been chipped from the teeth and efficiency is greatly impaired. The rollers are used for processing sugar cane.

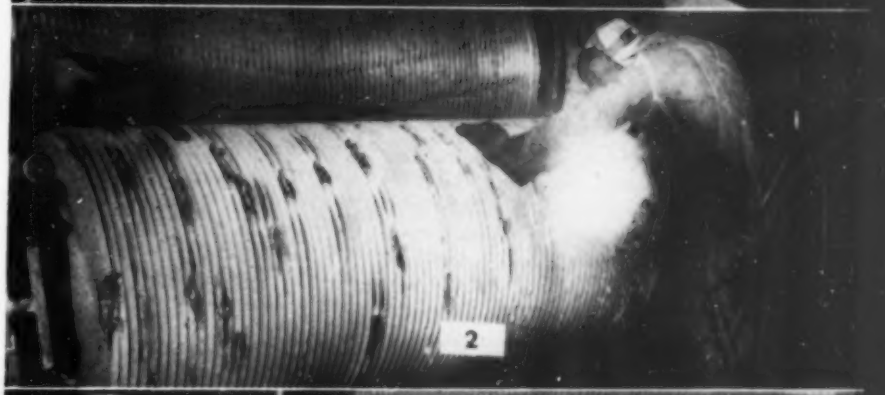
Fig. 2 The first operation is to remove 1/8 in. of juice impregnated metal from the defective areas. ChamferTrode, the oxygenless grooving electrode, is used for this purpose.

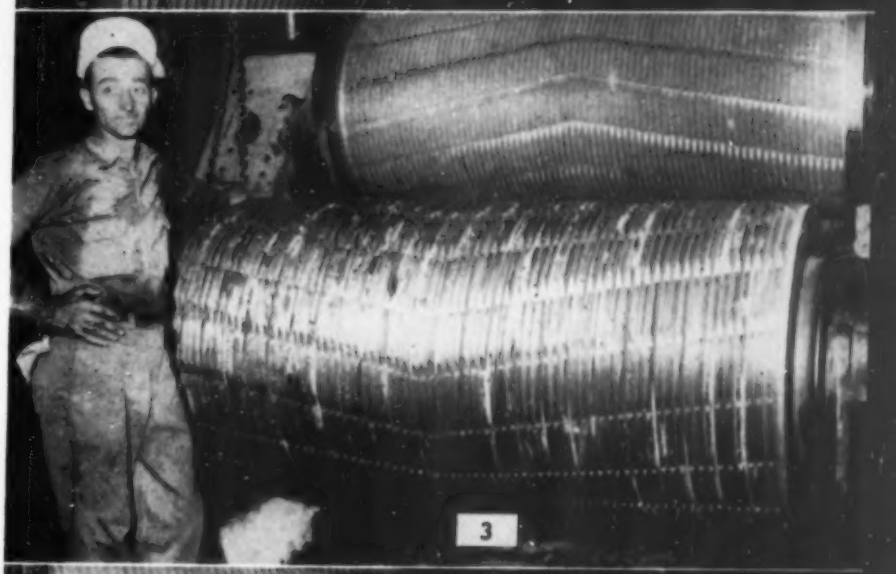
Fig. 3 The bottom roller is being welded with Xyron 2-24, an electrode especially formulated to operate at extremely low amperages upon cast iron. The top roller has been welded and machined.

Fig. 4 The finished rollers. When the recommended materials and procedures are used it is possible to effect the repairs in position without dismantling.

By GEORGE A. McNEELY
District Engineer
Eutectic Welding Alloys Corporation







HELPING the *MAN-IN-THE-PLANT*

Ideas..Methods..Gadgets

V-Block Reference Point Locator

WELDERS at Temco Aircraft Corporation in Dallas, Texas, are using a unique V-block device to lay out reference points on horizontal pipe they cut and assemble in jig-building.

The V-block virtually guarantees accuracy on lay-out preparations for halving, quartering, or attaching metal pads to pipe of any diameter. In addition, the block saves layout time—about ¾ manhour per shift on the average.

Welders had found it difficult to hold accuracy when making lengthwise cuts on long pieces of pipe. They could establish a centerline mark on one end of the pipe. But when they tried to mark a similar point at the pipe's other end, they had no means to insure that the two points, connected, would provide a straight line.

Welder Charles Gonday found the answer at a cost of only $5.

Equipment & Method

Basically, the tool he designed is an aluminum V-block, 4½-inches wide. A 10-cent protractor is mounted on a plate attached at one end of the V-block. A movable metal pointer is fixed so that it sweeps across the face of the protractor, and a 2½-inch bubble is mounted so that it moves with the pointer.

A prick punch is inserted at the point of the V—in line with the 90-degree point on the protractor.

To establish a center line on horizontal pipe, Gonday places his V-block on one end of the pipe, sets the pointer at 90 degrees on the protractor, and adjusts the block until the bubble is centered. Then he taps the punch, which marks on the pipe one end of the centerline.

LAY-OUT problems that normally complicate pipe-cutting are solved by this unusual V-block. Equipped with a protractor, leveling bubble and prick punch, the block enables its user to lay out any precision reference point on horizontal pipe.

He repeats this operation at the other end of the pipe, then connects the points with a straight-edge, if the pipe is short, or by popping a line, if the pipe is long.

If he wants to cut out a quarter-section of the pipe, lengthwise, he uses the line he has just drawn as one guide line. To get the other, he moves the pointer on his V-block to zero or 180 degrees on the protractor. Then he slides the block around the curve of the pipe until the bubble again is centered, and taps the punch again.

This procedure—repeated at the other end of the pipe—provides the two terminal points for the second guide line. The lines are exactly 90 degrees, or one-quarter of the pipe's circumference, apart. The same procedure is used to halve or otherwise section pipe length-wise.

Another chore that Gonday's V-block simplifies is that of accurately positioning pads on jigs made of pipe. These flat metal pieces are used to position or support assemblies that will be built in the jigs. Often, they must be attached at a precise number of degrees off of horizontal.

Gonday can locate attach points for pads simply by centering his V-block bubble with the pointer registering the required number of degrees off the center line. A stroke on the punch marks the spot where the pad should rest.

Turning Engine Over When Fly Wheel Is Off

THE illustrated device has proved particularly advantageous when repairing or overhauling an engine. Former method of turning the shaft consisted of a chain wrapped around the shaft, and bar.

The body of this device is a 6" ID nipple 8" long. Two 1" rods extending 12" from the sides are welded across one end for handles. A key is welded to the other end so that torque may be transmitted to the crank shaft.

This is a much easier and safer technique than the former chain and bar method. It also prevents possible shaft scoring. Particular device illustrated was designed for a 300 hp engine but it can be used for other engine sizes.

By WATTIE E. RUSSELL, Repairman, Gas Compressor Plant, Humble Oil & Refining Company, Kingsville, Texas.

Consider the value of Graphitization studies...

...when critical power piping is the order

This is one field where gouging pays off handsomely . . . at least when it's done by the device pictured above, a weld prober which gouges out boat-shaped samples of metal from piping that has seen lengthy service under high-temperature, high-pressure conditions.

When these samples are polished, etched, and then diagnosed under metallographic microscope their evaluation provides basic information in studies of graphitization, the phenomenon which prior to 1943 was considered of only academic interest.

Through the microscope and by means of mechanical tests Kellogg metallurgists carry on a continuous search for evidence of graphitization. They are hunting particularly for what they call the "eyebrow" or chain type of graphite. It is these malformations that cause planes of weakness in carbon steel and carbon moly power piping . . . weaknesses that can result in serious failures.

Although exactly why graphite forms is not definitely known, metallurgists have already come up with positive methods of inhibiting it. Still Kellogg specialists continue their research, endeavoring to pinpoint the exact causes of graphitization and to improve fabricating techniques and materials. More than 6,000 test pieces have been gouged out of actual service piping and evaluated by Kellogg technicians in the past decade.

Continual metallurgical research such as this graphitization program is just one of the basic reasons why any utility company obtains a valuable plus when it specifies . . . *main steam and reheat piping by Kellogg.*

* * *

New Power Piping Booklet Published . . . Send for descriptive literature about Kellogg's extensive facilities for assuring the highest quality workmanship. A section of the booklet is devoted to detailed coverage of the K-Weld* process.

OTHER FABRICATED PRODUCTS include: Pressure Vessels . . . Vacuum Vessels . . . Fractionating Columns . . . Drums and Shells . . . Heat Exchangers . . . Process Piping . . . Bends and Headers . . . Forged and Welded Fittings

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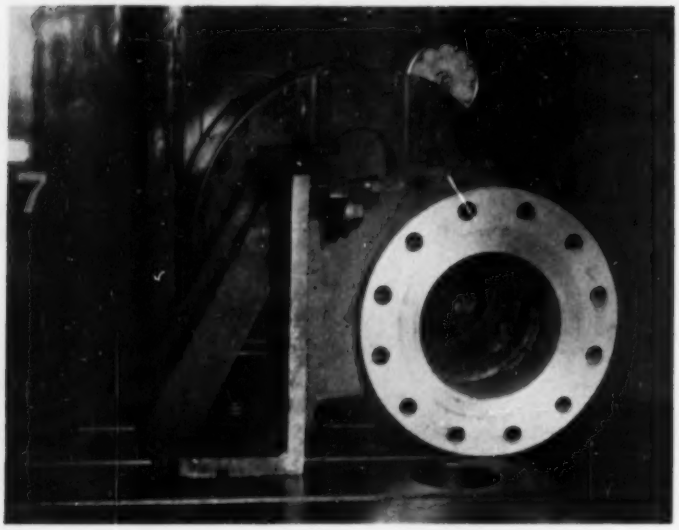


Angle Plate Mounting Speeds Machining

MANY various sizes of gate valves are machined in refinery shop each month. Machining a gate valve in the lathe requires four separate set-ups, one for each flange and one for each side of the wedge seat. The set-up time amounts to about 65% of the time required to complete the job.

The entire machining operation can now be completed in one set-up. Valve bodies are fastened to angle plate (see illustration) on the revolving table of a horizontal mill. Table is laid off in degrees and minutes. If the bodies are leveled and centered on the table, table may be turned around to machine the opposite side.

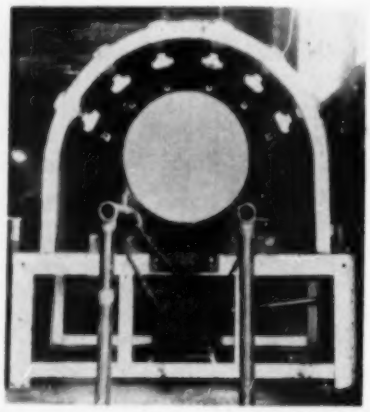
By ROBERT M. WALKER, Machinist Dept., Baytown Refinery, Humble Oil & Refining Company, Baytown, Texas.

Preheating Speeds Barrel Refinishing

IN MOST paint baking and drying operations heat is applied after painting to rapidly cure the finish.

However, the Barrel Remodeling Company, Kansas City, Mo., has found it to be faster and more efficient to do some heating before painting, and to let the heated mass dry the paint in effect "from the inside out."

Reclaimed barrels are placed on revolving rollers so that heat is applied uniformly and rapidly just before spray painting. Six of the Chromalox (Edwin L. Wiegand Co.) radiant electric heaters of the high intensity all-metal type were chosen for this application. Just 30 seconds is required to preheat the barrels to the required temperature of 175 F.



Reconditioned steel barrels are dried in 15 minutes by this method, in contrast to three or four hours previously required for air drying alone.

Falling Lamp Fixtures

THE pressure exerted on the disconnecting type reflector sockets when relamping with a pole will sometimes cause the socket to come apart and allow the fixture to drop. This can be avoided by the addition of a self tapping set screw to keep the socket from turning under pressure.

By A. F. SCHLOTTERER, Electrical Engineer, General Electric Company Power Transformer Plant, Rome, Georgia

High Efficiency With Low Manpower

OPERATION of five boilers, two turbo-generators, twenty-two Ammonia and Freon —12 compressors in four compressor rooms, water softening equipment to soften 500 gpm of well water, thirteen deep well pumps, four air conditioning units and the maintenance of the above equipment plus all auxiliaries, with a total crew of twenty-six men including foremen and supervisors should be a record hard to beat.

In addition to the above, the same crew maintains refrigeration equipment such as liquid ammonia pumps, cold wall tanks, votators, water coolers, etc. Water checks are made every two to three hours to insure close control of boiler feedwater treatment and boiler water. Two types of water softening equipment are used; the hot lime-soda ash followed by hot phosphate softening, and zeolite de-alkalizing units.

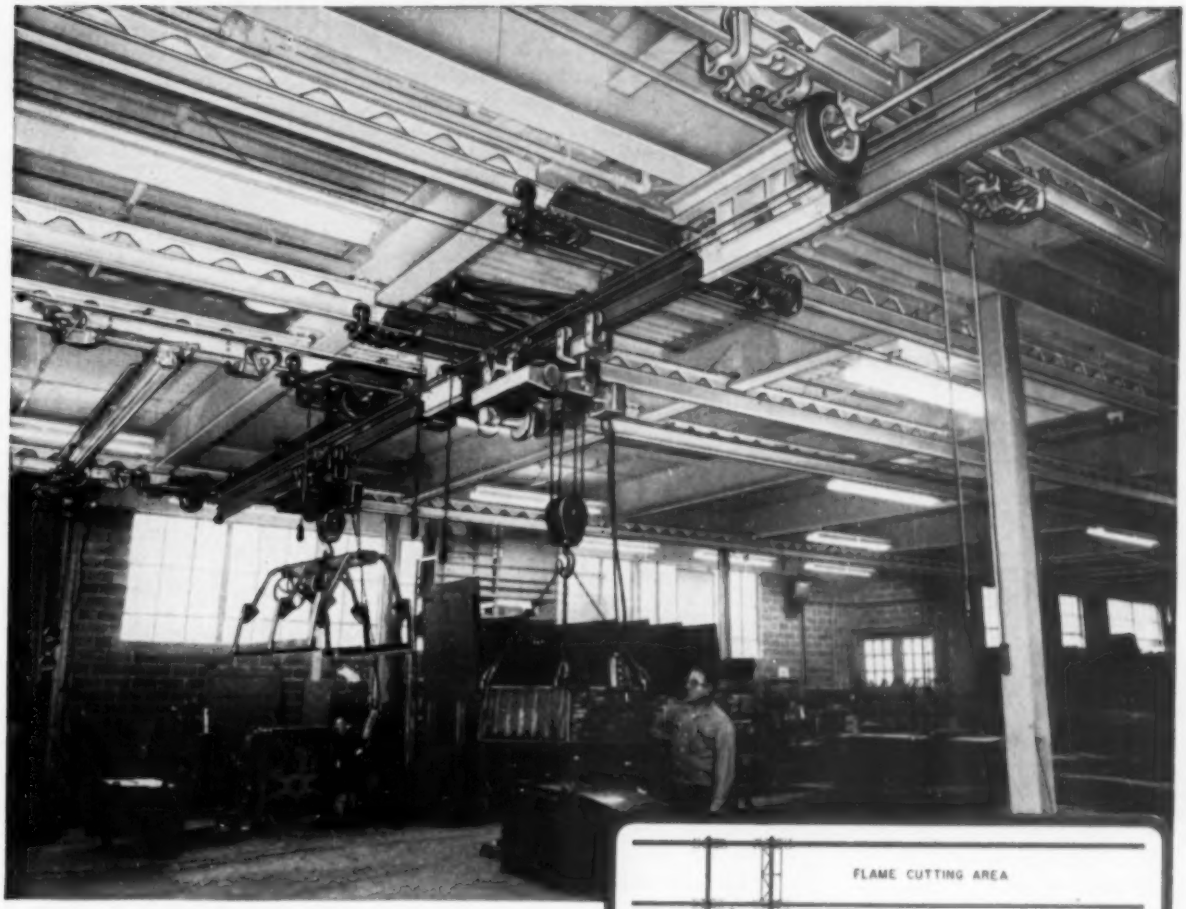
During the operating season our plant runs twenty-four hours a day and no one works over eight hours a day except in an emergency.

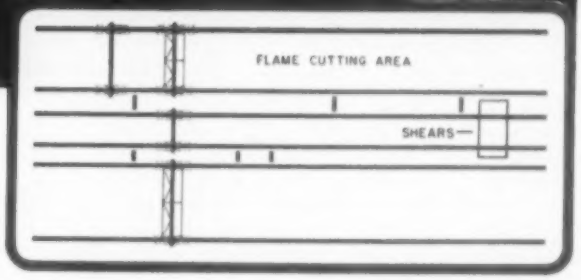
The above is accomplished by having one cold storage building of 100,000 sq ft floor area on fully automatic operation, and making use of flow meters, flow controllers and automatic control wherever possible.

We still think it is somewhat of a record for good operation, good maintenance and economy.

By A. T. LOHKAMP, Plant Engineer, Pasco Packing Co., Dade City, Florida

Need plant-wide handling?





Here Louden can serve you best

Typical of how Louden Engineered Handling Systems can integrate the handling operations in an entire plant or any part thereof, is the installation shown above. Here an eastern manufacturer uses a Louden Interlocked Crane and MotoVeyor System to cover unloading, storage, shearing and flame cutting. A Louden MotoVeyor picks up a 5-ton bundle of steel sheets or bar stock from a truck, travels via transfer sections from one crane to another, there to unload in storage, or to carry its load to shears or flame-cutting department. It does this without setting down the load, without rehandling, without delay or interference to other operations.

Handling costs are *always* cut, handling is *always* accelerated, manpower needs are *always* reduced, production *often* increases when Louden *engineered* systems take handling out of the hands of men, off the floor, out of the way of production. From integrated plant-wide handling system, to simple hand-pushed monorail carrier, Louden's longest experience and competent engineering will best meet your needs.

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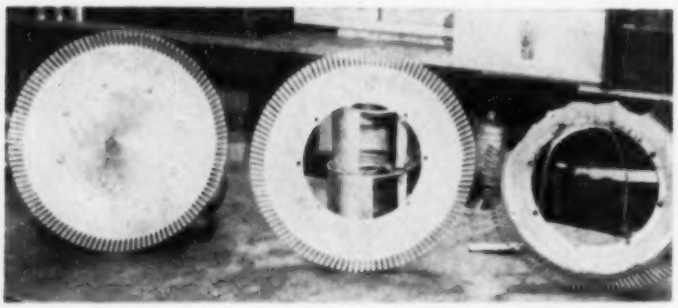
Mechanical Rollers for Feather Valve Strips

WHEN purchased, feather valve strips used on compressors in the refinery were straight. However, field experience showed that better service was obtained when the strips were bent to a slight arc before installation. This bend causes the strip to seat better and hold its seal longer than the flat strips.

Field machinists used to bend the strips to the desired curvature by hand. Under these conditions, it was not possible to have the individual strips in one valve conforming to the same arc; and consequently leaking valves were occasionally encountered. In addition valve strips were sometimes damaged during the bending process.

A small roller type bending tool is now used to give the desired arc to these strips. The mechanical roller, fabricated locally, has eliminated many of the difficulties encountered with strips having the incorrect arc.

By WILLIAM ZAWATSKY, Machinist, Machinist Dept., Baytown Refinery, Humble Oil & Refining Company, Baytown, Texas.



Finished repair assembly at left; stainless steel replacement plate with flange slotted on gear cutter (center); and broken brass part at right.

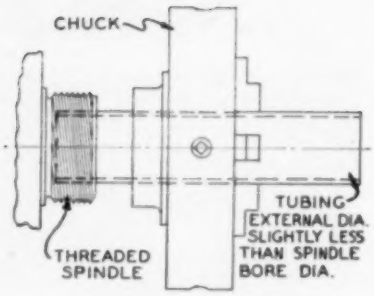
Economical Repair Technique for Spray Wheels

THE cost of maintaining spray wheels mounted on double extension shafts of 5 hp motors was reduced notably on air conditioning equipment at the Gastonia Combed Yarn Corp., Gastonia, N. C. One spray wheel is mounted on each end of the motor shaft.

Each of the brass spray wheels cost $52.00 when replacements were purchased; however, the machine shop effected the saving by making the spray wheels from stainless steel plates and cutting slots in the outer edge of the plate to serve as the water breaking surface (see photo). The slots were cut on a Brown and Sharpe gear cutter, and the cost of making the new spray wheels in the machine shop was $20.00, including labor and material.

The wheels turn at 1800 rpm, and each wheel diverts about 150 gallons of water per minute. The teeth or slots on the brass wheels broke from vibration and fatigue in service after about 5-6 years of service.

In this plant there are about 70 of the spray wheels operating around the clock every day. So far, about five wheels have been replaced with an appreciable saving. Satisfactory service is evident from the shop made parts, according to Jack Wilcox, master mechanic at the North Carolina plant.



Changing Lathe Chucks

WHEN mounting a lathe chuck on the threaded spindle, a short length of suitable diameter tubing or pipe, clamped loosely between the chuck jaws beforehand, as shown, and permitted to project into the hollow spindle, will serve to support the chuck and guide the threads while starting.

By THOMAS TRAIL, Catonsville, Maryland.

Refuse Reducer

THIS Jeffrey Manufacturing shredder is reducing barking drum refuse in a Louisiana paper mill to proper burning size for the power plant boiler room.

Unit is a Jeffrey 36 x 30 A-2 Wood Hog shredding 3 x 4″ pine bark and 12 x 18″ broken logs down to a minus 2″ square product at 15,000 lb/hr. Shredder is driven by a 75 hp motor.

HE BUILDS BODIES OF STAINLESS STEEL

■ An athletic instructor? No.

He's a skilled machinist, engaged here in machining stainless steel bodies for Yarway Impulse Steam Traps.

His work is typical of the skill and care taken with every Yarway product.

Even though thousands of steam traps are produced every month in the Yarway plant, each trap is machined, assembled, checked, tested and rechecked as if it were the *only* trap to be shipped. That's typical of other Yarway lines, too—blow-off valves, water level gages, indicators, expansion joints, strainers, etc.

Built into every Yarway product is workmanship and quality matched only by the product's sound design and dependable service. Try them and see. *Make Yarway your way.*

YARNALL-WARING COMPANY
Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.
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Yarway Impulse Steam Trap gets steam equipment hot in a hurry and keeps it hot.

YARWAY **STEAM PLANT EQUIPMENT**

POWER SHOW

PREVIEW—21st National Exposition of Power and Mechanical Engineering

PLACE—Commercial Museum, Philadelphia, Pa.

DATES—December 2-7, 1954, except Sunday

HOURS—Opens: Thursday, Dec. 2—2 P.M.; thereafter, 11 A.M. Closes: 10 P.M., except Saturday, Dec. 4, and Tuesday, Dec. 7, at 6 P.M. Closed all day Sunday, Dec. 5.

AUSPICES—The American Society of Mechanical Engineers concurrent with the 74th Annual Meeting of the Society. Under the management of the International Exposition Company.

FROM the standpoint of number of displays and multiplicity of products, steam equipment will dominate the 21st National Exposition of Power and Mechanical Engineering opening in Philadelphia, Pa., December 2nd.

The Exposition will be held for the first time at Philadelphia's Commercial Museum, instead of in New York as heretofore. Again it will be under the auspices of The American Society of Mechanical Engineers, and the dates, December 2 to 7, are both concurrent and following the annual New York meeting of the ASME.

Steam equipment displays will include everything for the power plant —from fuel handling equipment, through furnaces, insulation, air movement for combustion, and removal of waste gases, soot and ashes; to all kinds of major and incidental equipment on the water side; finally, steam handling with piping, valves and controls.

In the rather impressive array of **packaged steam generators,** one exhibitor will stress a highly efficient self-contained unit requiring relatively small space for maximum horsepower; another, a 100 hp steam generator designed for heavy oil fuel; a third will present "the most complete showing of packaged steam generators within the industry," including both fire and water tube types, in a capacity range from 700 to 45,000 lb/hr.

A 75 hp high-pressure boiler will feature a two-pass design incorporating a spinning gas technique. By this system a forced-draft fan delivers combustion air into the burner through two concentric rows of guide vanes, which provide in effect multiple-lead air screws. As the two sets of vanes are of opposite twist, the entering streams of primary and secondary air spin oppositely to produce a uniform, highly radiant flame and a high rate of heat transfer to the surrounding furnace wall. The combustion gases are spun again within each of the return tubes, whereby the effectiveness of the second-pass heating surfaces is greatly increased.

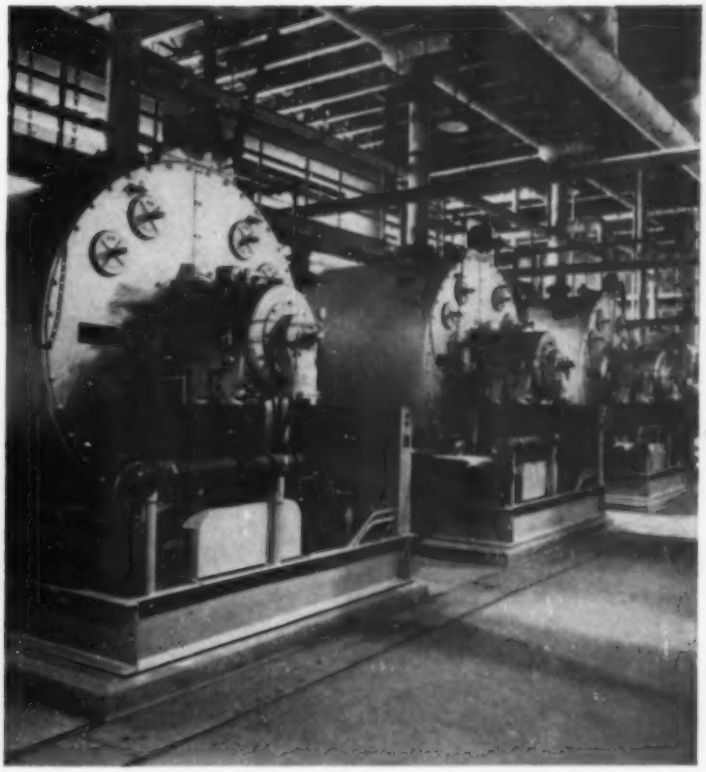
In the field of **power plant auxiliaries,** an exhibitor of boiler feed and condensate return systems will display a line of boiler feed pumps, mechanically sealed, and said to be capable of running dry for as much as two hours, "without burning up." Another display will feature "the largest (steam) traps built," in addition to pressure reducing valves capable of cutting down pressures as high as 600 psig to ounces, in a single valve.

A showing of forged-steel pipe unions will reveal many interesting design features, such as octagonal ends and steel-to-steel, ball-to-angle seats, all for high-pressure, high-temperature and corrosive services. The same exhibitor will show something unusual in an air engine pump, a light-weight hydraulic pump that runs economically on the shop airline pressure. Along with an exhibit of precision-drawn tubing of extremely fine finish and close tolerances at another booth, there will be a display of tube mill machinery, tube straighteners, tube pointers, and bending machines.

At one of the exhibits, representatives will be available to discuss questions relating to the control of slime in industrial waters, the feeding and weighing of flowable dry solids and the metering of gases. The exhibit itself will include a new wet chlorinator, built of corrosion-resisting materials and employing an improved design of the "visible vacuum" and water diaphragm principles of chlorine feed control. A dual orifice meter allows feed ranges up to 100-to-1 under automatic electric, hydraulic, air, or vacuum control.

A manufacturer of production control and **safety control instruments** will exhibit high voltage d-c insulation test sets designed to indicate definitely whether any given piece of apparatus may be continued under full load without risk of breakdown due to defective insulation, yet without impairing the insulation by the effects of the test itself. High speed static control systems will also be on display here, the purpose of which is to neutralize during processing the

IN HOSPITALS...



Modern *Powermasters*® Save in Many Ways!

FOR EXAMPLE: The new 240-bed Druid City Hospital, Tuscaloosa, Alabama, designed its steam system with three 300 HP gas-fired *Powermaster* Packaged Automatic Boilers. Light oil is provided as stand-by fuel.

Powermaster savings start with simplified installation. No special foundation or costly stack is needed. As delivered, *Powermasters* are factory-assembled and fire tested, fully equipped and wired ready for operation as soon as fuel, water, electrical and steam connections are made. Other savings are high fuel economy at all loads, compactness, maintenance-saving accessibility, dependable performance, time-saving attention, fully automatic operating and safety controls, smokeless combustion and hospital-clean operation.

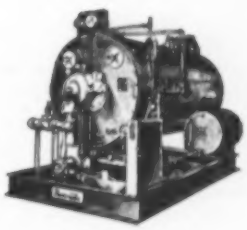
Prove for yourself that steam costs do go down where *Powermasters* go in. Compare *Powermaster*, feature by feature, and see why it is preferred by modern hospitals all over the world.

O&S

Powermaster®

PACKAGED AUTOMATIC BOILERS

In sizes to 500 HP; pressures to 250 psi.



ORR & SEMBOWER, INC. Morgantown Road, Reading, Penna.

charge on moving materials such as textiles, printing papers, and plastic sheets, by means of ionic bombardment.

The same exhibitor's alarm systems are used to protect areas where fires and explosions may be caused by static; sounding a buzzer and flashing a light when a dangerous condition is automatically detected. In a different area of explosive hazards, another exhibitor will offer liquid dust control systems. In one such, a compound is applied at various points throughout coal handling operations to allay dust, and thus remove the danger of explosive fires.

Peacetime Atomic Energy

With a salute to the atomic age, the Exposition will parade a greater variety of new developments than ever, from the first marketable reactor to the latest in "brains" for the robotized manufacturing plant.

More engineering and manufacturing companies are already at work on peacetime uses of atomic fission than is generally known, and more concerns are exploring its possibilities, notably in the field for tools to implement the new art. Massive results may not reach the consumer level for some time, but reactor engineering and the problems of heat transfer from supertemperatures down to customary degrees of heat are being studied in many quarters.

In view of this status, it is fair to expect that one of the headline exhibits at the Power Show will be one disclosing for the first time a **unitized design for research reactors.** This systematic project will provide the tooling for research and production groups which are at present digging at the very roots of reactor engineering. The concept underlying the exhibit is similar in principle to the application of interchangeable packaged units in machine tooling. From a selection of packaged, or in the exhibitor's phrase "unitized" components, the customer may select several or all of the mechanical units necessary to complete either a heterogeneous or a homogeneous reactor, according to the objective sought.

One exhibitor of reactor equipment is actively engaged in unitizing reactor components under a standardization program set up early in the present year. Some of the units are already in the prototype stage. Research reactor control systems presently being developed will include shim and regulating rod drive mechanisms and associated mechanical gear, rod guides, lattice assemblies, bridge

SPECIAL INSPECTION TRIP
Friday, 8:15 a.m., Dec. 3rd

United States Steel Corporation—Fairless Works and Power Show

An all-day tour has been arranged from New York City to the Fairless Works of the United States Steel Corporation in Morrisville, Pa., and to the Power Show in the Commercial Museum, Convention Hall in Philadelphia, Pa.

Tour, including box luncheon prepared by the U. S. Steel Corporation and transportation, will be $5.00 per person for those wishing to terminate the trip at the Power Show in Philadelphia and $6.00 per person for those making the round trip from the Hotel Statler in New York. No one is permitted to join the inspection party after it leaves the Hotel Statler in New York.

INSPECTION TRIP TIME SCHEDULE
Friday, December 3rd

8:15 a.m. Leave Hotel Statler
10:45 a.m. Arrive Fairless Works
1:00 p.m. Leave Fairless Works
2:30 p.m. Arrive Power Show
7:00 p.m. Leave Power Show for N. Y.
9:15 p.m. Arrive Hotel Statler

mountings for control equipment, a variety of irradiation devices, and handling tools.

Automatic Communications Multiply

Another feature of timely interest will be the numerous exhibits revealing **advances in automation,** ranging from the automatic regulation of a single mechanical operation to the "masterminding" of an entire power generating station.

One of the established leaders in automatic controls will offer for the first time an all-electronic load and frequency control system that is new from telemetering units to turbine. This system employs continuous pulse-rate telemetering to insure sensitivity and accurate readings, and may be installed with any form of transmission, such as wire, controlled carrier, or microwave. A choice of control method is also possible, including frequency, schedule, tie-line bias, manual control, and override. It is therefore applicable to a single plant or a system incorporating several plants and network distribution. The system is based on the "building block," or module plan for assembling interchangeable standard units, and is relatively low in cost because of the resulting installation economy, and also because signals to each station require only one channel, whereas older systems required three to four signal wires, or multiple channels, to transmit turbine control pulses.

Television for industrial application has made possible observations of events in power and processing plants that were once beyond the range of human vision, events occurring in remote or hazardous locations, particularly. By the aid of a 5 in. monitor of compact design, one exhibitor will demonstrate how a power plant supervisor, from a convenient location can observe combustion, smoke, and water level in the boiler drums, or see pictures of gage dials or recording instruments, wherever the rugged little individual TV cameras may be located.

By using the split-screen technique —brand new in this case—several such observations may be viewed simultaneously on a single monitor. Also, by using auxiliary monitors, the same observations may be registered simultaneously at several points.

The very latest offering by one exhibitor of industrial TV is a water-cooled lens system, which incorporates along with the camera mount a double-glass lens, heat exchanger, pump, and blower. With this equipment, direct viewing of furnace and other high temperature operations up to 3000 F may be televised. The new cooling system reduces infra-red radiation and lens temperatures at the camera below 120 F, affording stable, dependable camera operation.

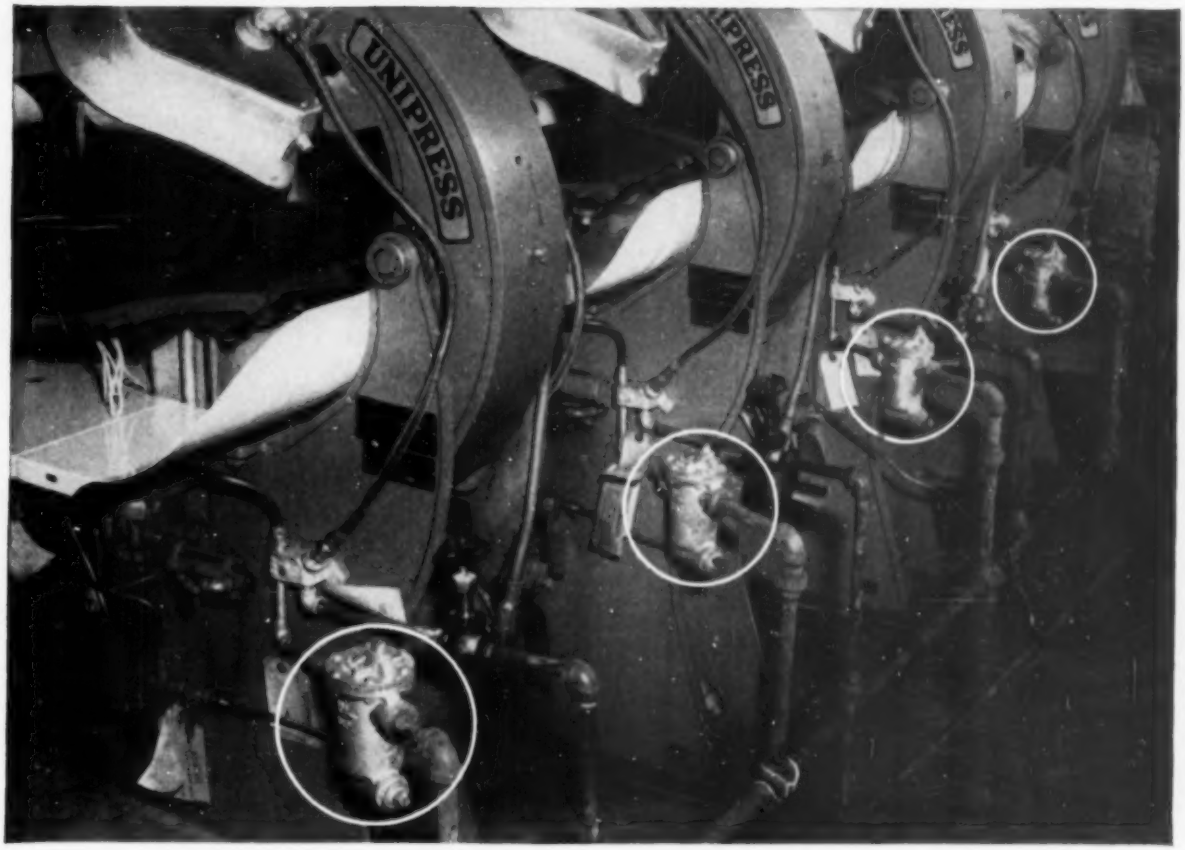
Another exhibit opening wide new uses in power and industrial plants includes noise measuring instruments, stroboscopes, voltage regulators having a high rating (6 kva), improved speed response (20 v/sec), and unusual accuracy (0.25%); also speed controls for small motors, which avoid the use of electron tubes.

Noise measuring instruments are used to compare over-all noises produced by machines, as in production testing, to test the effectiveness of insulation in buildings, to study noise effects on personnel in plants and determine acceptable tolerance levels. Applications, with equipment suited to different environments, may range from sound levels of 25 db in a scientifically designed broadcasting studio, to the 140-db whine of a jet engine; one of the exhibitor's sound-level meters, equipped with a microphone and an oscillograph, can be used to measure blast and shock waves.

Power Show Special Events

The Plant Engineers Club of Greater Philadelphia will hold a dinner meeting at the exposition on Thursday, December 2. The Instrument Society of America will hold an all-day symposium on Friday, December 3, at which technical papers will be presented discussing pertinent topics in that field. On Friday, the ASME will stage an inspection trip to the Show via the Fairless Works of United States Steel. Also held during the show will be a joint dinner and meeting of the Philadelphia chapters of the ASME and the American Society of Civil Engineers.

You can't save money by skimping on Steam Traps — An Armstrong Trap *on every unit* always pays dividends



Plant doubles production without appreciable increase in fuel costs

STRAINER BUILT IN

Built-in Strainer Traps save fittings, labor, maintenance. Cost less than separate trap and strainer. Complete data in literature mentioned below.

When Standard Coat, Apron & Linen Service took over a previous linen service plant in Portland, Maine, the boilers could hardly handle the steam load. Mr. Tom Foley, General Mgr. called Files Steam Specialty Company, Armstrong Trap Representative in New England, to help correct the condition.

Under supervision of Mr. Ken Raymond, Chief Engineer, Armstrong traps were installed on *each* unit in the plant.

Results: doubled production with no appreciable increase in fuel consumption; higher machine temperatures; boilers easily handle the load.

This is a typical example of the efficiencies and economies possible through Armstrong unit trapping. Could your plant stand a shot in the arm? Call your Armstrong Representative, or write:

ARMSTRONG MACHINE WORKS
806 Maple Street, Three Rivers, Michigan

SEND FOR FREE CATALOG

—The "Steam Trap Book" contains 44 pages of trap data—selection, maintenance, trouble-shooting. Free on request. Or Consult Sweets or CEC.

ARMSTRONG STEAM TRAPS

MANUFACTURERS EXHIBITING AT POWER SHOW

Exhibitor	Booth No.

—A—

ACEC Electric Corporation 40 E. 49th St., New York 17, N. Y.	402
Aerco Corporation P. O. Box 248, Northvale, N. J.	417
Aerodyne Development Corporation 1520 Lakeside Ave., Cleveland 14, Ohio	432
Aeroquip Corporation Jackson, Michigan	221-223
A'G'A' Division, Elastic Stop Nut Corp. of America, 1027 Newark Ave., Elizabeth, N. J.	630
ALLIS-CHALMERS MANUFACTURING COMPANY, P O Box 512, Milwaukee 1, Wis.	502 & 601
Allis Company, The Louis Milwaukee 7, Wis.	543-547
American Brass Company, The Waterbury 88, Conn.	514
American Cystoscope Makers, Inc. 1241 Lafayette Ave., New York 59, N. Y.	347
American District Steam Company, Inc., North Tonawanda, N. Y.	321-325
American Flexible Coupling Company, Erie, Pa.	225
American Pulley Company, The, 4200 Wissahickon Ave., Philadelphia 29, Pa.	647
American Society of Mechanical Engineers, The, 29 W. 39th St., New York 18, N. Y.	602
A.S.M.E. Mechanical Catalog and Directory, 29 W. 39th St., New York 18, N. Y.	602
American Water Softener Company, Fourth & Lehigh Ave., Philadelphia 33, Pa.	642
AMES IRON WORKS, INC., Oswego, N. Y.	532
Amplex Division, Chrysler Corporation, P. O. Box 2718, Detroit 31, Mich.	134
Anchor Packing Company, The, 401 N. Broad St., Philadelphia 8, Pa.	239
Anderson Company, The V. D., 1935 West 96th St., Cleveland 2, Ohio	713
ARMSTRONG MACHINE WORKS, Three Rivers, Mich.	310
Armstrong Steam Trap Company, Three Rivers, Mich.	310
ATLAS VALVE COMPANY, 280 South St., Newark 5, N. J.	324-326
Aurora Pump Company, Subsidiary of The New York Air Brake Company, Aurora, Ill.	702
Automatic Switch Company, 391 Lakeside Ave., Orange, N. J.	614

—B—

B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R. I.	204
Banning, J. A. G., 50 Church St., New York 7, N. Y.	S-25, S-27
Barrett-Cravens Company, 630 Dundee Road, Northbrook, Ill.	339-343
Barrows Porcelain Enamel Company, Cincinnati 13, Ohio	730
BEAUMONT BIRCH COMPANY, 1505 Race St., Philadelphia 2, Pa.	443
Beaver Pipe Tools, Inc., Warren, Ohio	S-31 & S-33
Beemer Engineering Company, 401 N. Broad St., Philadelphia 8, Pa.	229
BELCO INDUSTRIAL EQUIPMENT DIVISION, INC., 52 Iowa Ave., Paterson 3, N. J.	304
Beltran Associates, Inc., 1133 E. 35th St., Brooklyn 10, N. Y.	348
Benson, R. C., 4900 Wayne Ave., Pennsauken 8, N. J.	122
Bergen Pipesupport Corporation, 50 Church St., New York 7, N. Y.	150
Berry Division, Oliver Iron and Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.	625
Beta Electric Corporation, 333 East 103rd St., New York 29, N. Y.	737
Biddle Company, James G., 1316 Arch St., Philadelphia 7, Pa.	608
BOILER ENGINEERING & SUPPLY COMPANY, INC., Phoenixville, Pa.	106
Bolenz & Schafer, 50 Church St., New York 7, N. Y.	S-25, S-27
Bond Company, Charles, 617 Arch St., Philadelphia 6, Pa.	334
Boston Gear Works Division, The Murray Company of Texas, Inc., Quincy 71, Mass.	126
Bowser, Inc., Fort Wayne 2, Ind.	610
Brook Motor Corporation, 3555-7 W. Peterson Ave., Chicago 45, Ill.	635
Brown Fintube Company, Elyria, Ohio	226, 232
BUELL ENGINEERING COMPANY, INC., 70 Pine St., New York 5, N. Y.	121 & 125
Builders-Providence, Inc., 345 Harris Ave., Providence 1, R. I.	204
BYERS COMPANY, A. M., Clark Bldg., Pittsburgh 22, Pa.	208

—C—

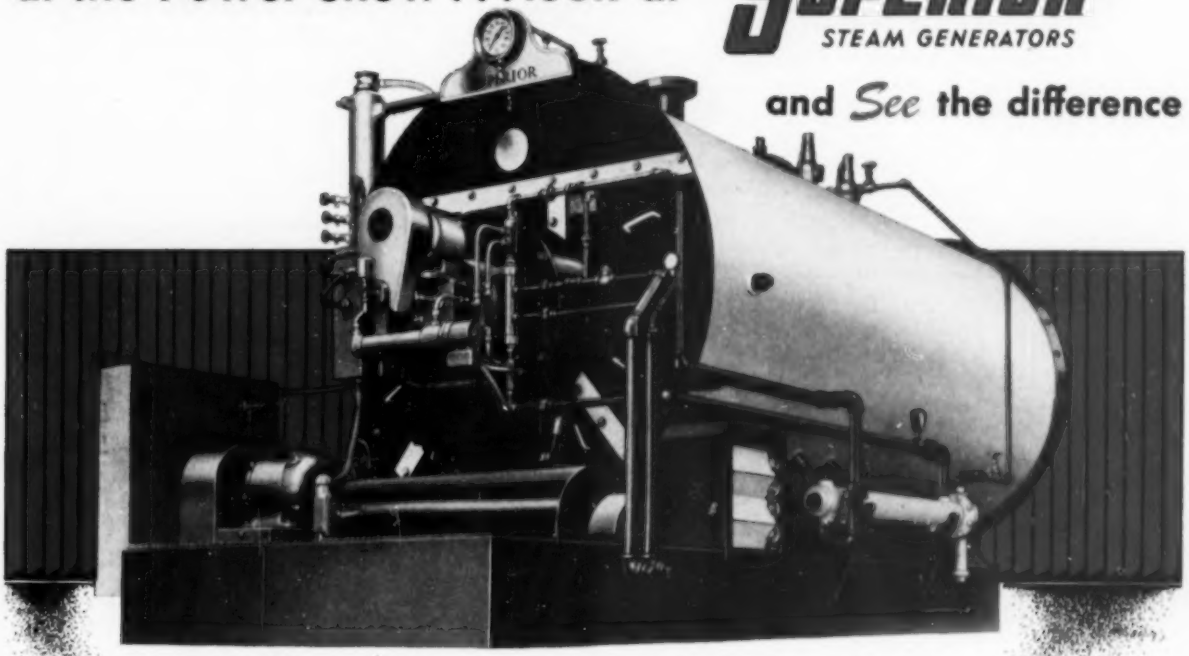
CAMBRIDGE INSTRUMENT COMPANY, INC., Grand Central Terminal Bldg., New York 17, N. Y.	102
Carey Manufacturing Company, The Philip, Lockland, Cincinnati 15, Ohio	634
Carpenter & Paterson, Inc., 18 Hurley St., Cambridge 41, Mass.	422
Chemical Development Corporation, Danvers, Mass.	729
Chemiquip Company, 460 W. Broadway, New York 12, N. Y.	719
Chiksan Company, Brea, California	305
The Clark Controller Company, 1146 E. 152nd St., Cleveland 10, Ohio	733
CLEAVER-BROOKS COMPANY, 326 E. Keefe Ave., Milwaukee 12, Wis.	147
Clements Mfg. Co., 6650 S. Narragansett Ave., Chicago 38, Ill.	238
Cleveland Worm & Gear Company, The, 3249 E. 80th St., Cleveland 4, Ohio	522
Clipper Belt Lacer Company, Grand Rapids 2, Mich.	419
Collins Packing Co., Inc., 401 N. Broad St., Philadelphia 8, Pa.	346
Connery Construction Company, 2nd & Luzerne Sts., Philadelphia 40, Pa.	613
CYCLOTHERM DIVISION, U. S. RADIATOR CORPORATION, 157 E. First St., Oswego, N. Y.	450

—D—

DAMPNEY COMPANY, THE, Hyde Park, Boston 36, Mass.	540
Dayton Rubber Company, The, 2342 Riverview Ave., Dayton 7, Ohio	110
DeLaval Separator Company, The, Poughkeepsie, N. Y.	606
De Walt, Inc., Lancaster, Pa.	S-22
DeZurik Shower Company, Sartell, Minn.	421
Diehl Manufacturing Company, Finderne Plant, Somerville, N. J.	714

at the Power Show . . . look at SUPERIOR STEAM GENERATORS

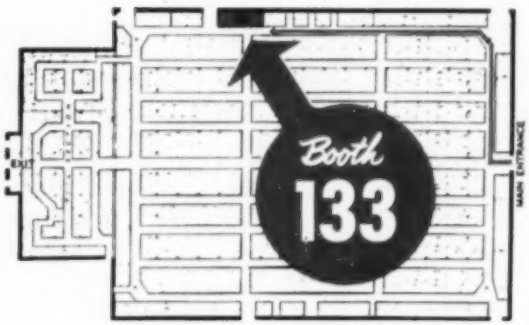
and *See* the difference



HERE'S WHAT TO LOOK FOR:

POWER SHOW

DEC. 2nd through DEC. 7th



COMMERCIAL MUSEUM
PHILADELPHIA

Look . . . at Superior's 4-pass fire-tube design . . . ample heating surfaces with a minimum of 5 sq. ft. per b.h.p.

Look . . . at Superior's built-in multiple induced-draft fans . . . drawing evenly across the entire tube area, and eliminating the need for an expensive chimney.

Look . . . at Superior's Rotary Burner with its own fan supplying primary air . . . fully automatic with oil or gas, or both . . . change from either fuel to the other quickly, without dismantling equipment or interrupting steam supply.

Look . . . at Superior's safety features . . . induced draft which prevents the escape of combustion gases into the boiler room . . . fool-proof combustion gas pressure-relief port . . . constant gas pilot throughout gas firing periods . . . dual purging of all gas passages, both before and after firing.

Look . . . at the overall picture . . . a complete packaged steam plant. One purchase shipped completely assembled after factory test to assure dependable operation at a guaranteed thermal efficiency of more than 80%.

Look . . . at Superior's catalog for the complete story. If you're not going to the show, write for Catalog 620.

for performance you can **BANK** *on*

SUPERIOR STEAM GENERATORS

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

POWER SHOW PREVIEW—Continued

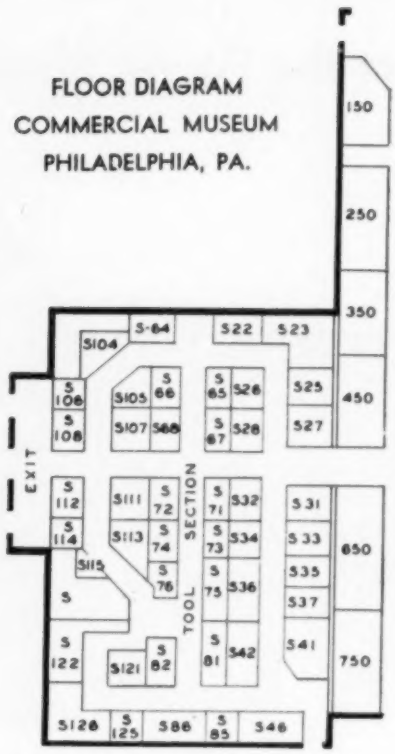
PLACE—Commercial Museum, Philadelphia, Pa.

DATES—December 2-7, 1954, except Sundey

Special round-trip bus service has been arranged between the leading Philadelphia hotels (starting at the Benjamin Franklin) and Commercial Museum where the show is being held.

For hotel reservations and advance registration cards write E. K. Stevens, president, International Exposition Company, 480 Lexington Ave., New York 17, N. Y.

FLOOR DIAGRAM
COMMERCIAL MUSEUM
PHILADELPHIA, PA.



MANUFACTURERS EXHIBITING AT POWER SHOW

Exhibitor	Booth No.
Disston & Sons, Inc., Henry, Philadelphia 35, Pa.	S-36
DOWELL INCORPORATED, P. O. Box 536, Tulsa 1, Okla.	409
Dudco Division, The New York Air Brake Company, 1796 E. Nine Mile Road, Detroit, Mich.	702
Durabla Manufacturing Company, 114 Liberty St., New York 6, N. Y.	700
DURAMETALLIC CORPORATION, 2104 Factory St., Kalamazoo 24, F, Mich.	447

—E—

Eagle Signal Corporation, Moline, Ill.	218
Edison, Incorporated, Thomas A., Instrument Div., West Orange, N. J.	720
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland 4, Ohio	333
Electrical World, 330 W. 42nd St., New York 36, N. Y.	747
Electro-Arc Manufacturing Company, P. O. Box 448, Ann Arbor, Mich.	S-64
Electromatic Water Treatment, Inc., 241 Church St., New York 13, N. Y.	745
Energy Control Company, Inc., 5 Beekman St., New York 38, N. Y.	720-722-730-732
Etlar Company, John R., 230 Regester Ave., Baltimore 12, Md.	244
EVERLASTING VALVE COMPANY, 49 Fisk St., Jersey City 5, N. J.	433

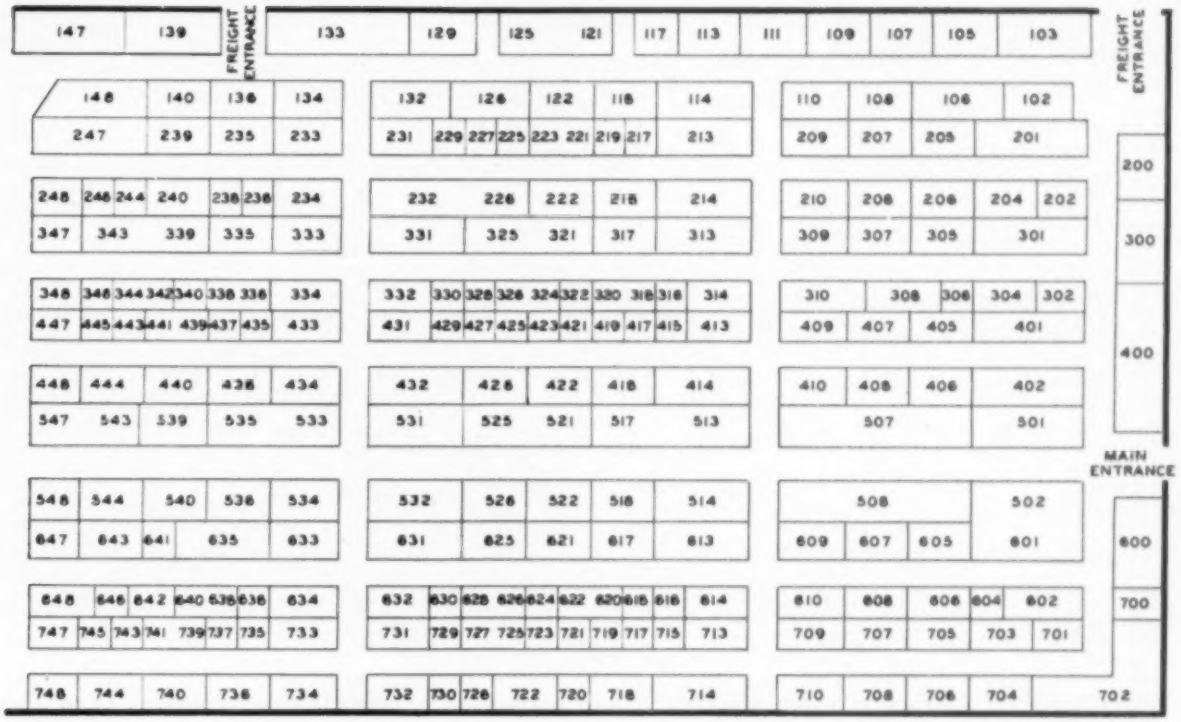
—F—

FAIRBANKS, MORSE & COMPANY, 600 S. Michigan Ave., Chicago 5, Ill.	650
Falstrom Company, Falstrom Court, Passaic, N. J.	707
Farrand Optical Company, Inc., Bronx Blvd. & E. 238th St., New York 70, N. Y.	744
Farval Corporation, The, 3249 E. 80th St., Cleveland 4, Ohio	522
Fenway Machine Sales Co., Inc., 263 N. 23rd St., Philadelphia 3, Pa.	S-65
Fleisher Chemical Co., P. O. Box 616, Benjamin Franklin Station, Washington 4, D. C.	645

Exhibitor	Booth No.
Flexitallic Gasket Company, Camden, N. J.	703
Flexonics Corporation, Maywood, Ill.	314
Foley Manufacturing Company, 3300 Fifth St., N.E., Minneapolis 18, Minn.	S-42
FOSTER ENGINEERING COMPANY, 835 Lehigh Ave., Union, N. J.	722
Foxboro Company, The, Foxboro, Mass.	350
Fuller Company, Fuller Bldg., Catasauqua, Pa.	218
FURNAS ELECTRIC COMPANY, 1000 McKee St., Batavia, Ill.	626-628

—G—

Gai-Tronics Corp., 607 Washington St., Reading, Pa.	240
GARLOCK PACKING COMPANY, THE, Palmyra, N. Y.	536
General Controls Company, 8080 McCormick Blvd., Skokie, Ill.	646
General Fittings Company, 123 Georgia Ave., Providence 5, R. I.	436
General Radio Company, 275 Massachusetts Ave., Cambridge 39, Mass.	234
General Refractories Company, 1520 Locust St., Philadelphia 2, Pa.	633
Globe Company, The, Grip-Strut Division, 4000 S. Princeton Ave., Chicago 9, Ill.	342-344
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 46, Wis.	439-441
Gordon Company, James T., Woolworth Bldg., New York 7, N. Y.	522
Goss Gas, Inc., P. O. Box 57, Route 8, Glenshaw, Pa.	425
Graham Transmissions, Inc., Menomonee Falls, Wis.	332



Exhibitor	Booth No.
GRINNELL COMPANY, INC., Providence 1, R. I.	531
GULF OIL CORPORATION, Gulf Bldg., Pittsburgh 30, Pa.	708

—H—

HAGAN CORPORATION, Hagan Bldg., 323 Fourth Ave., Pittsburgh 22, Pa.	544
Hagen Manufacturing Company, Inc., Moline, Ill.	320
Harbison-Walker Refractories Company, Farmers Bank Bldg., Pittsburgh 22, Pa.	209
Hein Company, Louis H., 15 W. Lancaster Ave., Ardmore, Pa.	206
Heli-Coil Corporation, Danbury, Conn.	231
Hewitt-Robins, Inc., 666 Glenbrook Road, Stamford, Conn.	148
Hewson Company, Inc., The, 443 Broad St., Newark 2, N. J.	405
Hills-McCanna Company, 3025 N. Western Ave., Chicago 18, Ill.	207
Homestead Valve Manufacturing Company, Coraopolis, Pa.	235
Honan-Crane Corporation, Lebanon, Ind.	736
Hungerford & Terry, Inc., 226 Atlantic Ave., Clayton, N. J.	233
Hydreco Division, The New York Air Brake Company, 1100 E. 222nd St., Cleveland 17, Ohio	702

—I—

Industrial Division, Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44, Pa.	533-535
Industrial Press, The, 140-148 Lafayette St., New York 13, N. Y.	715
Industrial Products Engineering Co., 26-40 Jackson Ave., Long Island City 1, N. Y.	317
Industry and Power, 420 Main St., St. Joseph, Mich.	338
Instruments Publishing Company, 845 Ridge Ave., Pittsburgh 12, Pa.	429

Exhibitor	Booth No.
Insulating Concrete Corporation, 3100 K St., N.W., Washington 7, D. C.	426
International Nickel Company, Inc., The, 67 Wall St., New York 5, N. Y.	508
Irving Subway Grating Company, Inc., 50-09 27th St., Long Island City 1, N. Y.	117

—J—

Janney Cylinder Company, Holmesburg, Philadelphia 36, Pa.	114
JENKINS BROS., 100 Park Ave., New York 17, N. Y.	250
Jiffy Tool Supply Co., Inc., 109 E. Nine Mile Road, Ferndale 20, Mich.	S-81
JOHNS-MANVILLE SALES CORPORATION, 22 E. 40th St., New York 16, N. Y.	111
Johnson Corporation, The, 805 Wood St., Three Rivers, Mich.	308
Johnson-March Corporation, The, 1724 Chestnut St., Philadelphia 3, Pa.	723

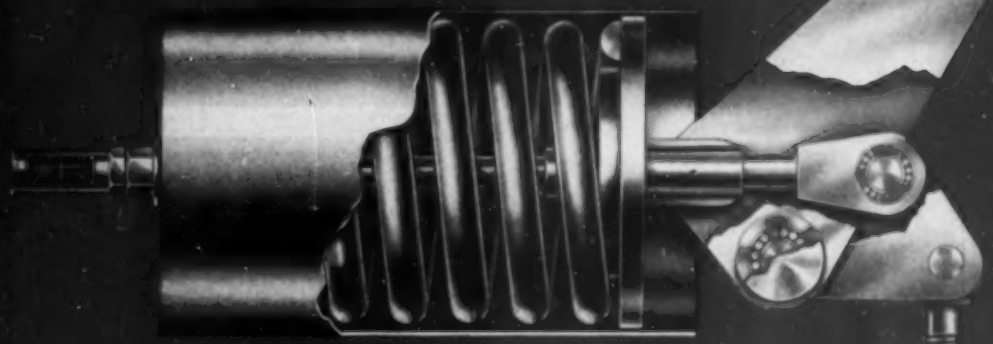
—K—

Kaiser Company, E. B., 2114 W. Lake Ave., P. O. Box 276, Glenview, Ill.	750
Keasbey & Mattison Company, Ambler, Pa.	526
Keeney Publishing Company, 6 N. Michigan Ave., Chicago 2, Ill.	415
Kent Company, Inc., The, Rome, N. Y.	648
Keystone Tool Corporation, P. O. Box 6717, Houston 5, Texas	740
Kieserling & Albrecht, 50 Church St., New York 7, N. Y.	S-25, S-27
Kinney Manufacturing Company Subsidiary of The New York Air Brake Co., 3529-3541 Washington St., Boston 30, Mass.	702
Klinger Corporation of America, The, 95 River St., Hoboken, N. J.	219
Kopperman & Sons, Joseph, 312-16 New St., Philadelphia 6, Pa.	227
Koppers Company, Inc., Metal Products Division, Baltimore 3, Md.	621
Krieg, Inc., Victor J., 611 Broadway, New York 12, N. Y.	S-72

Power Show Exhibitors—Continued

Exhibitor	Booth No.
—L—	
LESLIE CO., Lyndhurst, N. J.	605
Lonergan Company, J. E., 2nd & Race Sts., Philadelphia 6, Pa.	718
Lord Manufacturing Company, Erie, Pa.	435
LOVEJOY FLEXIBLE COUPLING CO., 4949 W. Lake St., Chicago 44, Ill.	548
Lukens Steel Company, Coatesville, Pa.	139
—M—	
MAGNETROL, INC., 2210 S. Marshall Blvd., Chicago 23, Ill.	732
MANNING, MAXWELL & MOORE, INC., 250 E. Main St., Stratford, Conn.	521-525
Martindale Electric Co., The, P. O. Box 617, Edgewater Branch, Cleveland 7, Ohio	S-66
MASON-NEILAN REGULATOR COMPANY, 1190 Adams St., Boston 24, Mass.	103
McGraw-Hill Publishing Company, 330 West 42nd St., New York 36, N. Y.	747 & 401
Mechanical Engineering, 29 West 39th St., New York 18, N. Y.	602
Mechanical Handling Systems, Inc. 4600 Nancy Ave., Detroit 12, Mich.	246
Meirath Supply & Gasket Co., Inc., Tioga St. & Aramingo Ave., Philadelphia 34, Pa.	301
MERCOID CORPORATION, THE, 4201 Belmont Ave., Chicago 41, Ill.	434
Metallizing Company of America, 431 E. 75th St., New York 21, N. Y.	S-26
Metalock Repair Service, Inc., 36-15 48th Ave., Long Island City 1, N. Y.	132
Minneapolis-Honeywell Regulator Company, Industrial Division Wayne & Windrim Aves., Philadelphia 44, Pa.	533-535
Monroe Tube Company, Inc., 50 Church St., New York 7, N. Y.	S-25, S-27
Mundet Cork Corporation, 7101 Tonnelle Ave., North Bergen, N. J.	413
—N—	
NATIONAL AIROIL BURNER COMPANY, 1284 E. Sedgley Ave., Philadelphia 34, Pa.	222
NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, 525 William Penn Place, Pittsburgh 30, Pa.	431
NATIONAL VALVE & MANUFACTURING COMPANY, 3101 Liberty Ave., Pittsburgh 1, Pa.	335
Neumann & Welchman, Inc., 22-12 Raphael St., Fairlawn, N. J.	444
New Hermes Engraving Machine Corporation, 13-19 University Place, New York 3, N. Y.	S-28, & S-67
New York Air Brake Company, The, 230 Park Ave., New York 17, N. Y.	702
Newman Industries (America), Inc., 43 Broad St., New York 4, N. Y.	631
NIAGARA BLOWER COMPANY, 405 Lexington Ave., New York 17, N. Y.	507
NICHOLSON & COMPANY, W. H., 12 Oregon St., Wilkes-Barre, Pa.	609
—O—	
Oliver Iron and Steel Corporation, Berry Division, Oliver Bldg., Pittsburgh 22, Pa.	625
ORR & SEMBOWER, INC., Reading, Pa.	400
Owens-Corning Fiberglas Corporation, National Bank Bldg., Toledo, Ohio	704
—P—	
Packard-Van Riper Corp., 34 Exchange Place, Jersey City, N. J.	242
Parker Appliance Company, The, 17325 Euclid Ave., Cleveland 12, Ohio	710
Perfecting Service Company, 332 Atando Ave., Charlotte, N. C.	440
Phelps Company, Inc., Charles C., 700 New York Ave., Union City, N. J.	717
PHILADELPHIA GEAR WORKS, INC., G St. below Erie Ave., Philadelphia 34, Pa.	539
Philadelphia Pump & Machinery Co., 4946 Parkside Ave., Philadelphia 31, Pa.	205
Phillips Drill Company, U. S. 12, Michigan City, Ind.	S-68
Pittsburgh Corning Corporation, 1 Gateway Center, Pittsburgh 22, Pa.	136
Plant Engineering, 110 S. Dearborn St., Chicago 3, Ill.	632
PLIBRICO COMPANY, 1800 Kingsbury St., Chicago 14, Ill.	406
Porter & Co., Incorporated, H. W., 825 Frelinghuysen Ave., Newark 5, N. J.	217
Power, 330 W. 42nd St., New York 36, N. Y.	401
Power Engineering, 110 S. Dearborn St., Chicago 3, Ill.	632
%Proportioneers, Inc.%, Providence 1, R. I.	204
—R—	
R & R Company, P. O. Box 77, Sharon Hill, Pa.	236
Radio Corporation of America, Engineering Products Division Camden 2, N. J.	518
Rapid Electric Co., 2881 Middletown Road, Bronx 61, N. Y.	322
RAYBESTOS-MANHATTAN, INC., Packing Division Manheim, Pa.	607
Reeves Pulley Company, Columbus, Ind.	410
Republic Manufacturing Company, 1930 W. 77th St., Cleveland 2, Ohio.	340
Republic Steel Corporation, Steel and Tubes Division 224 E. 131st St., Cleveland 8, Ohio.	113
Research-Cottrell, Inc., Bound Brook, N. J.	107
Revco Incorporated, 2 E. Franklin Ave., Minneapolis 4, Minn.	639
Rhoads & Sons, J. E., 35 N. 6th St., Philadelphia 6, Pa.	748
Ribble Co., C. H., 261 Broadway, New York 7, N. Y.	626-628
Richardson Control Systems, Clifton, N. J.	624
Ric-wil Company, The, Barberton, Ohio	705
Ridge Tool Company, The, Elyria, Ohio	S-46, S-85
Robinson, Inc., John R., 38-05 30th St., Long Island City, N. Y.	427
Rockwood Pulley Mfg. Co., 20 Crosby St., New York 13, N. Y.	124
Rockwood Sprinkler Company, 38 Harlow St., Worcester, Mass.	218
Roth Company, Roy E., 2420 Fourth Ave., Rock Island, Ill.	307
Rotherm Engineering Company, Inc., 7280 West Devon Ave., Chicago 31, Ill.	316
—S—	
S & S Machinery Company, 140 53rd St., Brooklyn, N. Y.	S-112
Sanson & Sons, Inc., Henry E., 2215 N. American St., Philadelphia 33, Pa.	445
SARCO COMPANY, INC., Empire State Bldg., New York 1, N. Y.	534
Schaub Engineering Company, Fred H., 2110 S. Marshall Blvd., Chicago 23, Ill.	248
Schrader's Son, A., Division Scovill Manufacturing Co., 470 Vanderbilt Ave., Brooklyn 38, N. Y.	S-37, S-41
Sellers Injector Corporation, 1600 Hamilton St., Philadelphia, Pa.	616
SHELL OIL COMPANY, 50 W. 50th St., New York 20, N. Y.	407
Sier-Bath Gear & Pump Co., Inc., 9252 Hudson Blvd., North Bergen, N. J.	109
Sims Pump Valve Co., Inc., 1314 Park Ave., Hoboken, N. J.	618

You Get Time-Tested Dependability With



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335

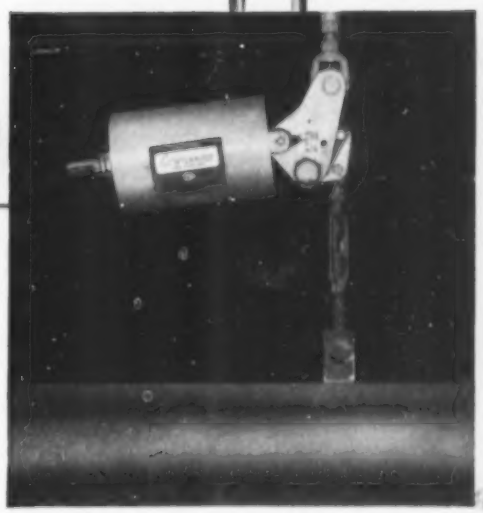
NAVCO
Counterpoise*
Pipe · Hangers

The constant load-carrying capacity of Navco Counterpoise* Pipe Hangers has been proven during an extended period of satisfactory service as the first accurate and efficient support for high temperature piping systems. They are being used extensively in steam generating stations, refineries and chemical plants.

The Counterpoise Hanger is a spring-actuated counterbalance. An ingenious system of linkage transforms the varying force of the spring in an accurate mathematical ratio to produce a load supporting effort of constant value throughout the entire range of expansion travel.

The design permits great flexibility of installation and saves valuable space in congested areas. All parts are ruggedly made and have a high safety factor, yet excess weight and oversize physical dimensions have been avoided to hold space and structural load requirements to a minimum.

The Navco Counterpoise Hanger is available in 16 different frame sizes with load capacities ranging from 200 to 16,000 pounds and expansion travels up to 12 inches. For detailed information on how you can get dependable support with this unique hanger, write today for our 12-page illustrated bulletin #153.



Note above how the flexible top connection permits the hanger assembly to fall in line with the direction of the load pull, so that horizontal travel of the piping has no appreciable effect on the hanger operation. The unit may be positioned at any angle. This affords flexibility in installations where close clearances are a factor.

** Counterpoise is a trade name of the National Valve & Manufacturing Company*

NAVCO

NATIONAL VALVE & MANUFACTURING COMPANY

3106 LIBERTY AVENUE, PITTSBURGH 1, PENNSYLVANIA

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Sparling Meter Company, P. O. Box 3277, Los Angeles 54, Calif.	617
Specialty Engineering Co., Torresdale Ave. & Pennypack St., Philadelphia 36, Pa.	743
Spence Engineering Company, Inc., 29-41 Grant St., Walden, N. Y.	701
Spencer Turbine Company, The, 486 New Park Ave., Hartford 6, Conn.	620-622
Spittler, Inc., Henry A., 50 Church St., New York 7, N. Y.	S-25, S-27
Square D Company, 6060 Rivard St., Detroit 11, Mich.	108
SQUIRES COMPANY, THE C. E., 18502 Syracuse Ave., Cleveland 10, Ohio	330
Star Expansion Bolt Co., 147-149 Cedar St., New York 6, N. Y.	636
Steel and Tubes Division, Republic Steel Corporation, 224 E. 131st St., Cleveland 8, Ohio	113
Stephens-Adamson Mfg. Co., Aurora, Ill.	734
Stow Manufacturing Co., 443 State St., Binghamton, N. Y.	140
Strachan-MacKee Corporation, 90 West St., New York 6, N. Y.	731
Strong, Carlisle & Hammond Company, 1392 W. Third St., Cleveland 13, Ohio	202
Sumco Engineering Company, P. O. Box 193, Caldwell, N. J.	709
SUPERIOR COMBUSTION INDUSTRIES, INC., 1475 Broadway, New York 36, N. Y.	133
Superior Electric Company, The, Bristol, Conn.	313
Swivelier Company, Inc., 43 34th St., Brooklyn 32, N. Y.	739-741

—T—

Taller & Cooper, Inc., 75 Front St., Brooklyn 1, N. Y.	448
Technical Publishing Company, 110 S. Dearborn St., Chicago 3, Ill.	632
Temp 'O' Crete International Corporation, 1133 E. 35th St., Brooklyn 10, N. Y.	348
TEXAS COMPANY, THE, 135 E. 42nd St., New York 17, N. Y.	418
THOMAS FLEXIBLE COUPLING COMPANY, Warren, Pa.	721
Toledo Pipe Threading Machine Co., 1425-1445 Summit St., Toledo 4, Ohio	S-23
Trerice Co., H. O., 1420 W. Lafayette Blvd., Detroit 16, Mich.	638-640
Troy Engine & Machine Company, 1492 Railroad Ave., Troy, Pa.	604

Exhibitor	Booth No.

—U—

U. S. Electrical Motors, Inc., P. O. Box 2058, Terminal Annex, Los Angeles 54, Calif.	331
UNITED STATES STEEL CORPORATION, NATIONAL TUBE DIV., 525 William Penn Place, Pittsburgh 30, Pa.	431

—V—

Vapor Heating Corporation, 80 E. Jackson Blvd., Chicago 4, Ill.	214
Velan Engineering Ltd., 6585 Jeanne Mance St., Montreal Que. Canada	210
Vickers Electric Division, Vickers Incorporated, 1815 Locust St., St Louis 3, Mo.	408
Vogt Machine Co., Henry, 10th & Ormsby Sts., Louisville 10, Ky.	501
Voss Co., Inc., J. H. H., 785 E. 144th St., New York 54, N. Y.	302

—W—

WALDRON CORPORATION, JOHN, P. O. Box 791, New Brunswick, N. J.	735
Wallace & Tiernan, Inc., 25 Main St., Belleville 9, N. J.	309
Ward Leonard Electric Company, 115 MacQuesten Parkway S., Mt. Vernon, N. Y.	423
Watertown Division, The New York Air Brake Co., Watertown, N. Y.	702
Watson-Stillman Fittings Division, H. K. Porter Co., Inc., Roselle, N. J.	300
WESTINGHOUSE ELECTRIC CORPORATION, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.	414
Wetzler Clamp Company, 43-15 11th St., Long Island City 1, N. Y.	S-35
WHEELER MANUFACTURING COMPANY, C. H., Sedgley Ave., 19th & Lehigh, Philadelphia 32, Pa.	201
Wiedeke Company, The Gustav, 1833-1901 Richard St., Dayton 1, Ohio.	437
WING MFG. CO., L. J., Vreeland Mills Road, Linden, N. J.	200
Wright-Austin Company, 3245 Wight St., Detroit 7, Mich.	731

—Y—

YARNALL-WARING COMPANY, Chestnut Hill, Philadelphia 18, Pa.	513-517
Yorkshire Copper Works, Ltd., Leeds, England	731

—Z—

Zurn Mfg. Co., J. A., Erie, Pa.	225

Why We Must Enlarge Our PRIVATE WORKS Program

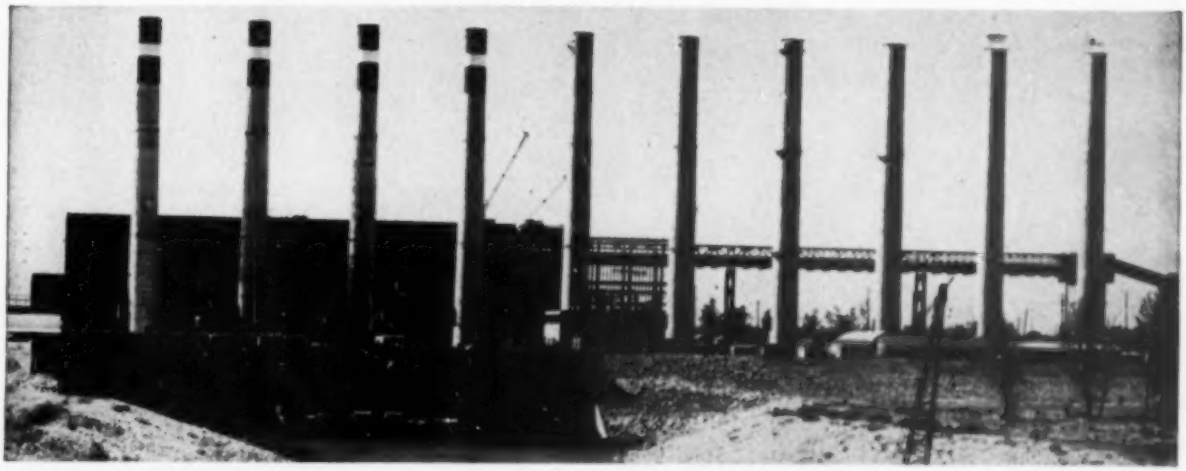
(Starts page 59—see "Timely Comments")

income tax on his first $2,000—just as he does now; and then he would pay 100% on everything over $2,000. That means that no man or woman in America would be permitted to keep more than $1,600 of taxable income a year. And the Government would still be three billion dollars short of raising the money it would need if it tried to take over the private works program!

Nor could a burden of this size be financed safely through inflation, Mr. Fairless insisted, because in addition to providing work for those who are now unemployed, America must in the next 20 years create jobs for 22 million newcomers to the labor market. This, he said, would require a capital investment of "substantially more than a quarter-trillion dollars."

"If we really believe in maximum employment, and if we truly desire to make jobs for those who are now out of work, then we must acknowledge frankly the need for enlarging our private works program. . . . We must also acknowledge, I think, that the only known way to expand private works is to preserve investment incentive and to encourage the hope of profit."

Like All Valuable Property Your Chimney Needs Care



Custodis Construction Company, Inc., built for the Tennessee Valley Authority at the Shawnee Steam Plant near Paducah, Kentucky, ten reinforced concrete chimneys 299' x 14' including foundations with independent linings of perforated radial brick.

ANY job, large or small, receives the careful attention and benefit of Custodis' long experience, sound engineering, expert supervision and skillful workmanship. Custodis excels in this work—a sparkling example is TVA's Shawnee Steam Plant pictured above—and you profit from their more than 50 years of stack experience. Whether your chimney is of brick, steel or concrete, a systematic maintenance plan can be money in the bank for you. Turn to the expert engineers and inspectors of Custodis, skilled in all phases of this highly specialized work. If the chimneys in your plant are cracked or corroded, stop this operating liability with a call to Custodis.

CUSTODIS CONSTRUCTION COMPANY, INC.

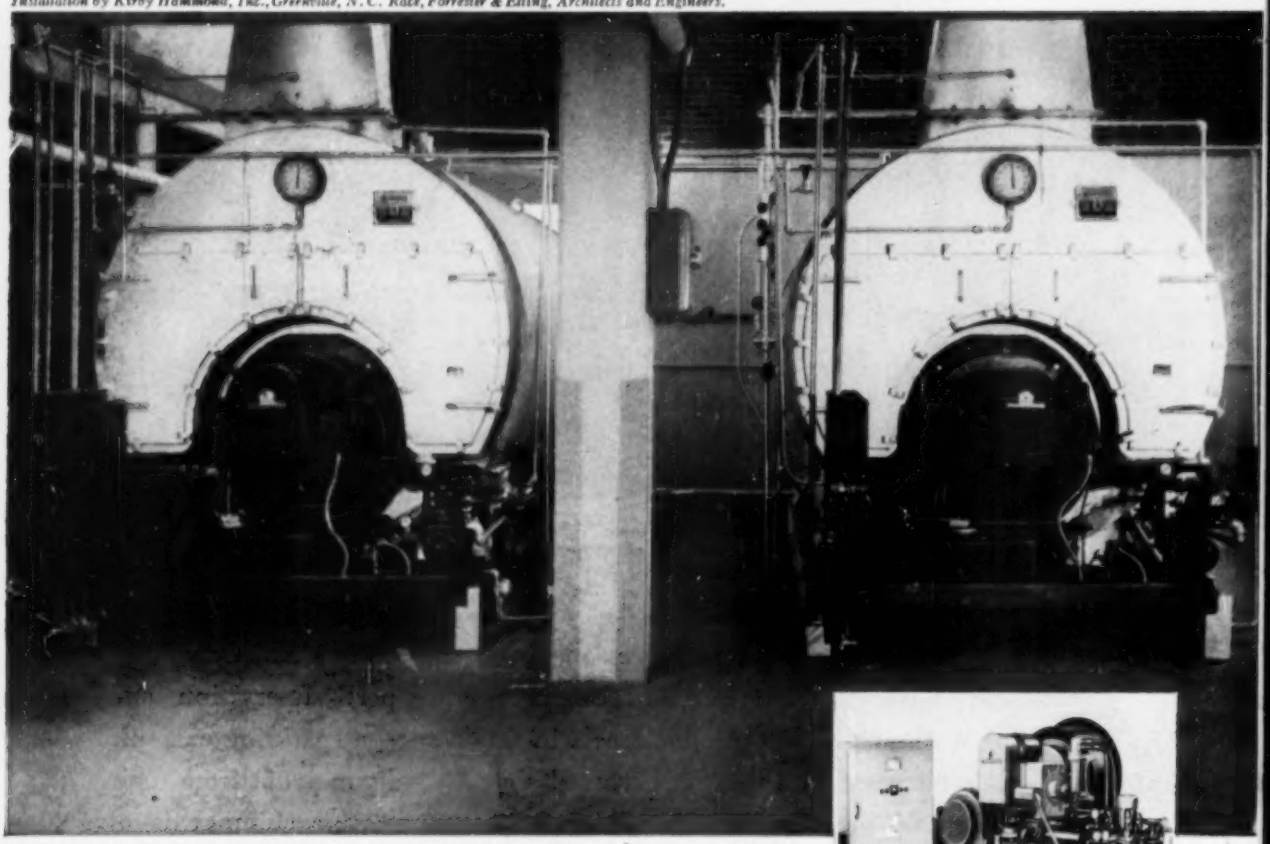
■ ATLANTA
806 Henry Grady Bldg.
WA 1183

■ NEW YORK
157 Chambers St.
DI 9-3944

■ CHICAGO
22 West Monroe St.
RA 6-3614

"Packaged" for better firing at lower cost

Installation by Kirby Hammond, Inc., Greenville, N. C. Race, Forrester & Elting, Architects and Engineers.



Iron Fireman packaged industrial oil burners integrated with Scotch marine type boilers in the plant of Belrug Mills, Inc., Greenville, South Carolina. At right, Iron Fireman oil-gas packaged unit. With this unit it is possible to switch fuels at any time, at a moment's notice.

Engineered as a single complete unit

This Iron Fireman package unit is much more than a conversion burner. It's a complete combustion system in which all elements are correctly balanced and integrated—a thoroughly engineered firing plant. It includes burner (for oil or gas or both), fuel system, forced draft air supply, control panel, and pre-formed refractory combustion throat. Installation requires little more than bolting the entire unit to the boiler front and making service connections for power and fuel.

To the user this means an attractive saving in installation time and cost. But even more important, it means a factory assembled and tested unit instead of a locally assembled job. It means dependable performance and high operating efficiency, with substantial fuel savings. It's the *smart* way to modernize your boiler room.

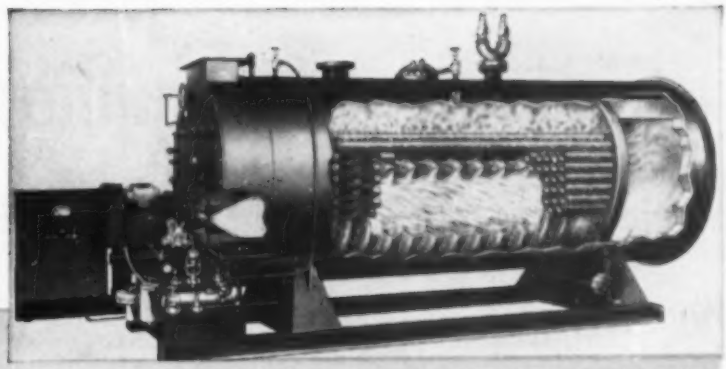
Get in touch with your Iron Fireman dealer, or mail the coupon on the opposite page for complete information.

THE IRON FIREMAN

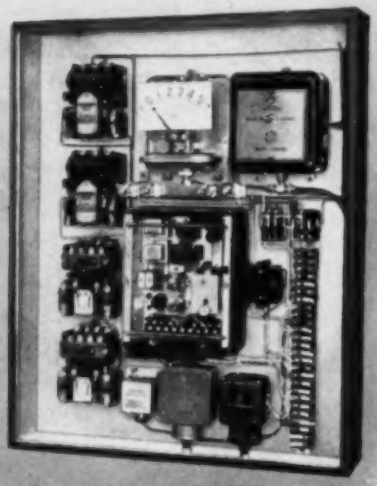
Iron

OIL, GAS AND COAL FIRING

OIL, GAS or OIL-GAS COMBINATION BURNER UNIT BY IRON FIREMAN



Cutaway view of packaged boiler-burner unit consisting of Scotch marine boiler with Iron Fireman combination Gas-Oil forced draft burner. The shift from one fuel to another is accomplished quickly, with no sacrifice in firing efficiency.

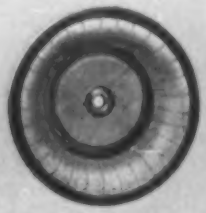


WIRED, TESTED CONTROL PANEL

Control panel is totally enclosed, with all instruments wired and tested at the factory. Entire wiring system is coded, with varicolored wires and numbered terminal strip inside panel. An indicating meter on the panel door shows the condition of the control system at all times. Indicating lights on panel front show operating status of unit at a glance. Green lights show motors in service; red indicates safety lockout.

IRON FIREMAN ROTARY OIL BURNER

The oil firing unit is the Iron Fireman rotary cup oil burner which has an outstanding record of reliability in precision firing of hard-to-handle heavy oils. Heart of the oil control system is the Iron Fireman Oil Volumeter, a variable volume metering pump submerged in the oil reservoir, which delivers the correct volume of oil to the burner head with extreme accuracy, regardless of changes in oil viscosity. Burns any grade of oil, from lightest to heaviest, without special adjustment.



REFRACTORY COMBUSTION THROAT

The combustion throat, with preformed built-in refractory, is an integral part of the burner unit. Both primary and secondary air are admitted to the combustion chamber through this throat, eliminating the special brickwork required by the usual conversion burner and greatly improving the air-fuel mixture. Oil cup is in the center of the refractory disc, which also shields the gas jets against the radiant heat of the furnace. Adjustable inlet vanes control the shape and rotation of the flame to match the requirements of the firebox or firetube.

No divided responsibility

No separate contracts for (1) boiler setting (2) electrical wiring (3) oil heating equipment (4) automatic control system (5) forced draft system (6) boiler refractory.

You can install a complete new boiler plant quickly and economically by specifying an Iron Fireman packaged burner and a Scotch marine type boiler engineered specifically for use with this unit. Forced draft, no high stack required. Or you can install the Iron Fireman packaged burner in practically any type of existing boiler, with important savings in installation and operating costs.

How to specify

First, decide what fuel or fuels you want to use (oil, gas or oil-gas combination). Second, determine the load. Third, refer to table in Iron Fireman catalog or specifications for the correct size of burner and boiler for your job.

For more information use the coupon below.

Fireman

FOR HEATING, PROCESSING, POWER

Iron Fireman Mfg. Co., 3054 West 106th Street, Cleveland 11, Ohio. In Canada, write 80 Ward Street, Toronto, Ontario.

Please send me literature giving full information on the Iron Fireman "packaged burner" unit.

Name _____

Address _____

City _____ *State* _____

Equipment . . Supplies . . Methods

FOR FREE INFORMATION — Circle code number on pages 16 & 17

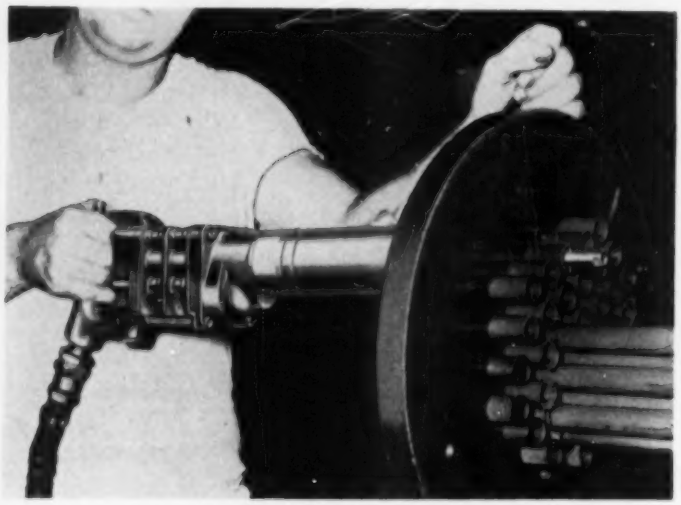
Flame Failure Protection

Z-1 COMBUSTION CONTROL DIVISION, ELECTRONICS CORPORATION OF AMERICA, 718 Beacon St., Boston, Mass., offers complete protection against explosion hazards of burning fuel to users of light oil, gas, and combination light oil/gas burners, by means of the new Fireye Combustion Control System FJ-2.

Employing the flame-sensitive "Firetron" Cell, the system visually monitors oil and gas, main and pilot flames, and shuts off all fuel two to four seconds after the flame goes out. It eliminates explosion hazards that cost millions of dollars annually.

The system automatically programs the startup, operating, and shutdown cycle of the burner, permitting unattended operation. On piloted burners, it does not allow the main fuel valve to open until the pilot flame is established. Where direct electric spark ignition is used, the programming control provides a five second trial-for-ignition period. The control cycles each time operating or limit control closes but must be manually reset following flame failure. It includes a safe-start feature whereby component failure or the presence of flame prior to startup will prevent burner operation.

The control is built to withstand vibration and give continuous performance under the most adverse operating conditions. Its plug-in chassis provides maximum accessibility and ease of installation.



Airetool's cutter is self-centering and a double-action cutting tool with two cutters. Especially applicable where small diameter tubes must be removed frequently from condensers and heat exchangers.

Internal Tube Cutter

Z-2 THE AIRETOOL MFG. CO., 304 S. Center St., Springfield, Ohio, has developed a new Internal Tube Cutter, lightweight in design and fast in operation. To remove damaged or leaky tubes from condensers and heat exchangers.

Precision-made of heat treated alloy steel, and featuring tough, tool steel double cutters, which are easily replaced when worn, the cutter is inserted in the tube and quickly cuts the tube behind the tube sheet. Airetool Tube Removal Tools are then used to knock out and remove the remaining portion of the tube in the header.

The Internal Tube Cutter is powered by an air-driven motor. An additional feature is its positive feed by lever action control. It will cut steel and non-ferrous condenser tubes from ⅝" to 1" O.D., and can be used through tube sheet thicknesses of 1" to 4". The ball bearing collar, which prevents friction, is adjustable.

Non-Mechanical Pressurizing System for Submersible Pumps

Z-3 BYRON JACKSON CO., P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif., has introduced the "Pressurmatic" non-mechanical oil pressurizing system for submersible pumps, now featured in the BJ Subette Pump.

This exclusive design provides automatic sealing pressure to the oil in the motor without the use of mechanical devices. For safety, the Pressurmatic tank keeps the pump and motor off the sediment-filled bottom of the well.

Emphasized as being the answer to small industrial and pumping needs, the pump is packaged for water requirements ranging from 30 to 260 gpm from wells 6 and 8 inch I.D. and larger. Available motor sizes range from 5 to 35 hp. Among the many advantages claimed for the Subette Pump are simple and quick installation, inexpensive operation, and silent, vibrationless performance. These pumps are also adaptable to crooked wells because the close-coupled submersible motor and pump eliminate shaft problems. The motor is unaffected by weather extremes and will run for years without attention.

Two-Stage Pumps

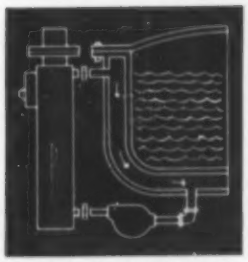
Z-4 GOULDS PUMPS, INC., Dept. SPI, 75 Fall St., Seneca Falls, N. Y., announces a new series of two-stage pumps for handling clear liquids.

These pumps are available in 5 sizes, providing heads up to 1,000 ft, and capacities up to 1,000 gpm. Opposed impellers insure hydraulic bal-

For controlled heating of liquids and gases

CHROMALOX

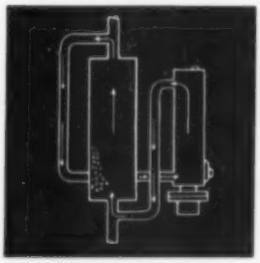
Electric Circulation Heaters



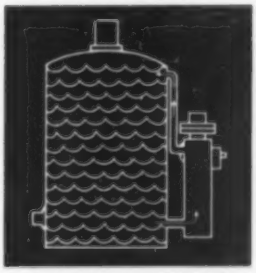
Circulation heater connected to jacketed process kettle.

including

- **Water, oils and heavy fuel oils.**
- **Nitrogen, steam, air and other gases.**
- **Aroclor, Dowtherm, Prestone and other heat-transfer mediums.**



Circulation heater as part of nitrogen heating assembly for reactivating alumina.



Circulation heater connected to water tank as "side-arm" heater.

Chromalox Electric Circulation Heaters are "packaged" heaters ready to install and connect wherever you need dependable heat that is efficient, economical and easy to use. They give you measured quantities of heat up to 750° F. that can be accurately controlled and maintained around the clock. May be used in series. Available in capacities from 1 kw. to 100 kw. in standard voltages.

CHROMALOX CATALOG 50

contains complete data on Chromalox Circulation Heaters for all applications. Write for your copy today.

This coupon will bring you catalog 50

IC-73

Industrial Division, EDWIN L. WIEGAND COMPANY
7563 Thomas Boulevard, Pittsburgh 8, Pa.

Please send me Catalog 50.

Name_____

Company_____

Street_____

City_____ Zone_____

State_____

CHROMALOX

Electric Heat for Modern Industry

C. B. Rogers and Associates, 1000 Peachtree St., N. E., **Atlanta** 5, Ga.; L. R. Ward Co., 3009-11 Canton St., **Dallas** 26, Texas; 1511 Texas Avenue, **Houston** 3, Texas; Hanson, Wallace & Co., 116½ East Fourth Street **Charlotte** 2, N. C.

ance, and thrust balance is achieved by the use of a unique new labyrinth diaphragm.

The pump was designed with special attention to operating efficiency and ease of maintenance. The casing is horizontally split, and the interior can be inspected, and the rotating parts removed and replaced, without disturbing piping connections. Bearing spans have been kept short, resulting in a space saving of as much as 50% in comparison with other pumps of equivalent head and capacity. Wide interchangeability of parts has been provided, so that spare parts inventories can be kept at a minimum.

Standard features of the pump include sealed bearing housings, protecting bearings against moisture and dirt, cowl-type glands suitable for use with quenching liquids, stainless steel impeller keys, Teflon water-seal rings, corrosion resistant gland bolts, renewable stuffing box bushings, and die-formed packing.

For more data circle item code number on the postage free post card — p. 17

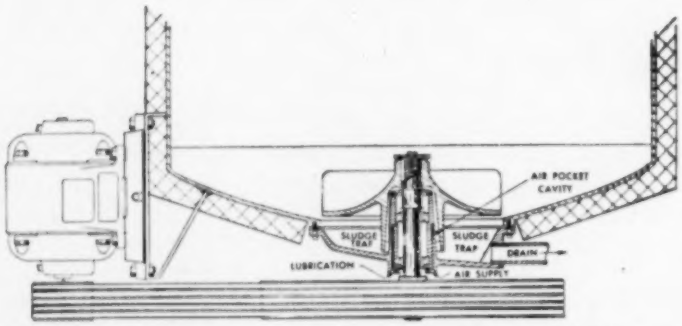
Mechanical Cleaning Systems for Industrial Applications

Z-5 STORM VULCAN, INC., 2225 Burbank St., Dallas 19, Texas, is marketing "Turbo-Blast" parts cleaning machines in sizes from 20 to 2300 gallon solution capacities.

Designed for industrial plant maintenance departments as well as production line duty, the mechanical washing machine applications include washing, degreasing and stripping.

Design features include the Turbo-Blast impeller units which force the detergent-charged solution into all recessed areas of the parts being cleaned. Units save time, operate economically, clean thoroughly and occupy only approximately one-third the floor area usually required for other systems of equal cleaning capacity.

Standard industrial model 248-B (illustrated) is equipped with two impellers each powered with a 10 hp motor. Work area is 93" x 46¼" x 34"; solution capacity is 990 gallons.

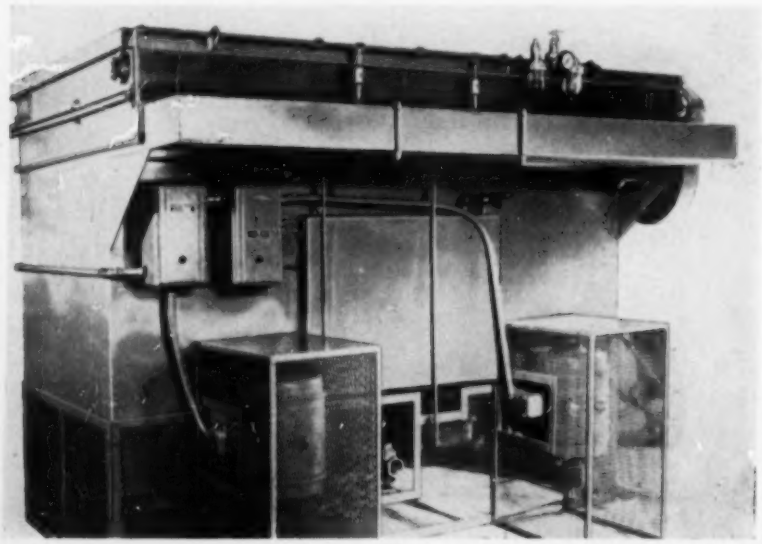


TURBO-BLAST impeller units — shaft is mounted on sealed bearings and the unit is encased in an air cavity formed by impeller housing casting. Sludge trap and drain are conveniently located. Impellers are belt-driven by individual motors.

It is equipped with double embossed plate coils for steam heat and can be equipped for gas burner units.

Turbo-Blast agitator units are assembled in a variety of groupings to provide any capacity of cleaning area, from the one-unit size to extremely large installations. Conveyorized applications can be provided in any desired lengths with fluid depths up to 6 ft.

Circle the above code number for a copy of Storm-Vulcan's 4-page brochure covering Turbo-Blast Washing Machines for industrial cleaning applications.

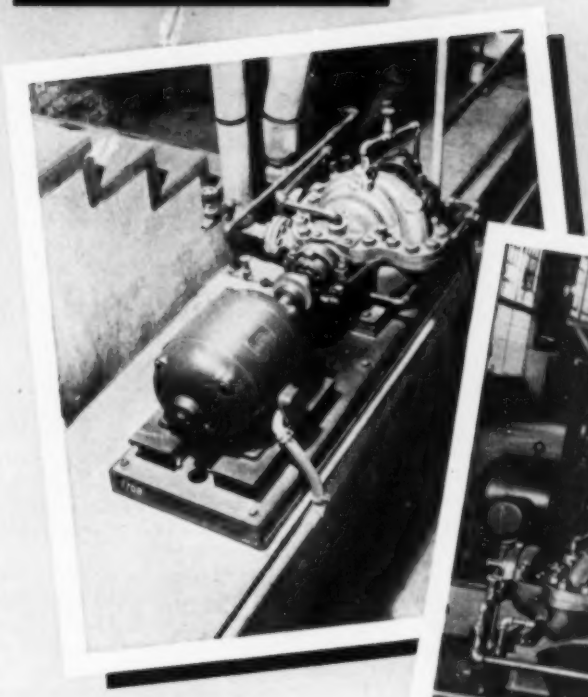


Storm-Vulcan's model 248-B (rear view) was especially designed for use with two-layer solvent type carbon remover solutions with water seal. It saves on heating costs and prolongs tank-life of cleaning materials. The combination baffle plate and cover also keeps down steam odors and vapors. Baffles are opened and closed by pneumatically operated drive.

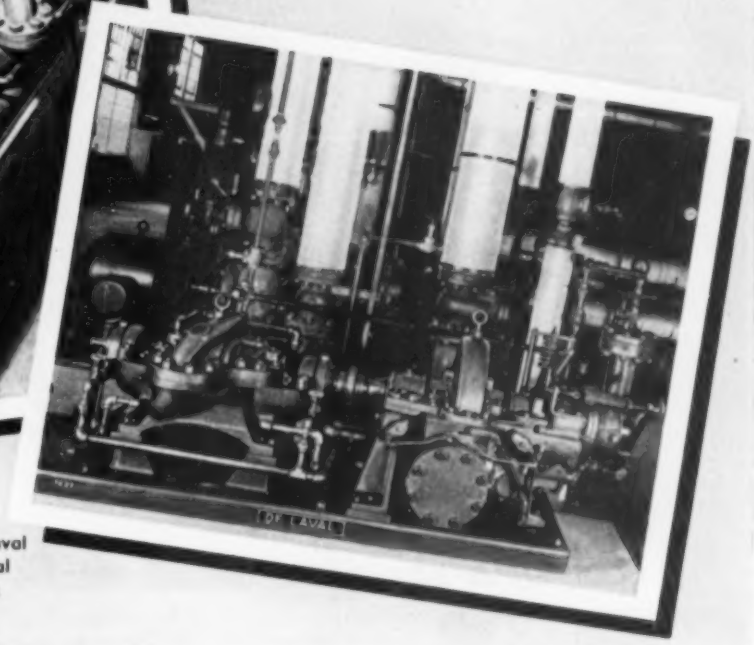
Baffle plate permits application of powerful agitation with highly effective two-layer stratified cleaning materials heretofore used only in still soak tanks or with mild agitation. Separation is at the point of stratification and the upper layer remains absolutely still to form a perfect seal.

DE LAVAL
TWO-STAGE HORIZONTAL PUMPS

for dependable boiler feed service in institutions . . . industrial plants



Institutions can't afford shutdowns. In this hospital installation a motor-driven 21S boiler feed pump provides year-in, year-out dependability. It delivers 70 gpm of 240° water at 420 ft. head.



Industrial plants, too, choose reliable De Laval pumps for boiler feed service. This De Laval unit, driven by a De Laval turbine, delivers 160 gpm of 215° water at 520 ft. head.

There are good reasons why De Laval 21S-2KS two-stage horizontal split case pumps give long, economical boiler feed service. They are designed with • back-to-back impellers for balanced hydraulic thrust • easily replaceable threaded impeller wearing rings • long life labyrinth case rings • ring oiled ball bearings — plus ten other important design features.

These De Laval pumps are available in sizes from 2" to 8" discharge, for capacities from 75 to 3,000 gpm and heads to 750 ft.

Write for Bulletin 1501 giving complete data.

DE LAVAL *Boiler Feed Pumps*

DE LAVAL STEAM TURBINE COMPANY

817 Nottingham Way, Trenton 2, New Jersey

DL 874

new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

Heavy Duty Electric Hoist

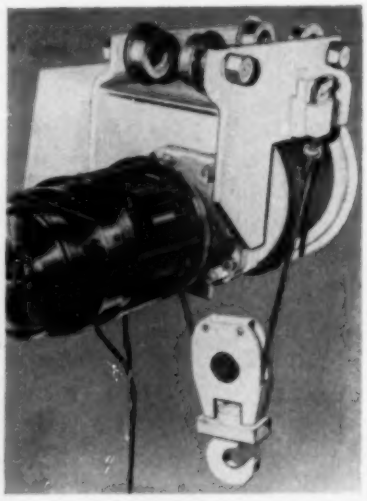
Z-6

R. G. LeTourneau, Inc., P. O. Box 2037, Longview, Texas, is marketing a new line of heavy duty electric hoists in 4- to 15-ton capacities featuring load-inching controls and light, compact design.

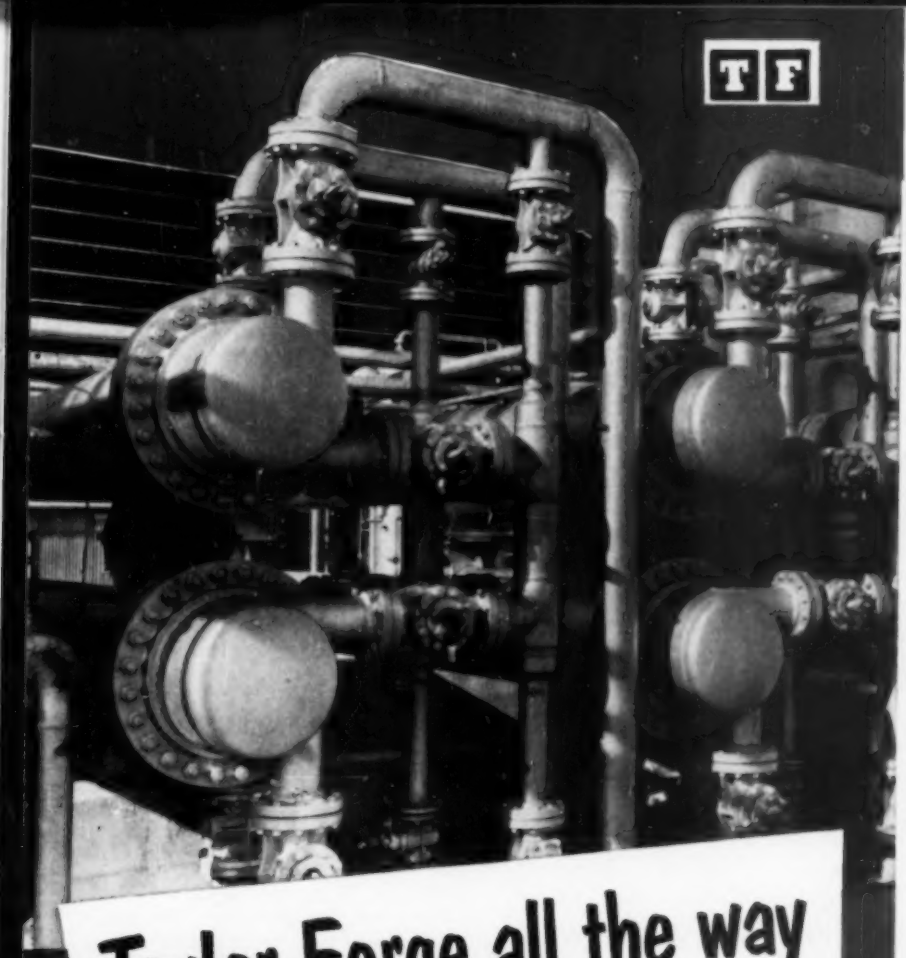
Combination motor-load brake permits precise "inching" of a heavy load up or down and assures safe load control by the operator at all times. Brake and motor are synchronized. High-capacity metal friction surfaces engage automatically by spring action when power is broken in the motor circuit. Starting the motor in either direction of rotation causes the combination motor-load brake to be released by an electromagnet and the motor takes over the load.

Hoists are built for outdoor use. Motors have no moving contacts for dirt and moisture to attack. Contactors are totally enclosed in a weatherproof steel box. Contact points are renewable and are readily accessible by removing the cover and gasket from the contactor box.

Standard hoists have their load block and hook suspended by a two-part wire rope line. Slower drum speeds and better spooling are the result of the two-part suspension, and less wear occurs with only one sheave for the rope to bend around. Where conditions require, hoists with single-part line are available.



LeTourneau hoists are available in 4 to 15-ton capacities with load-inching controls and light, compact design.



Taylor Forge all the way

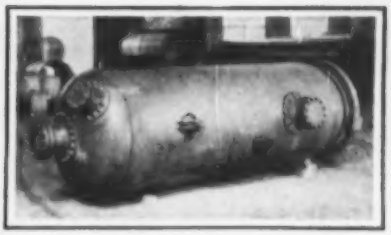
Throughout the power and process industries you will see hundreds of model installations like this where someone who wanted to be sure has specified Taylor Forge all the way through...WeldELLS,® flanges, welding necks, nozzles.

Whatever your needs—simple or complex—it will pay you to *use* all the way through, the products that have *led* all the way through.

See your Taylor Forge Distributor for up-to-the-minute facts.

TAYLOR FORGE

TAYLOR FORGE & PIPE WORKS • General Offices and Works: P.O. Box 485, Chicago 90, Illinois • Offices in all principal cities Plants at: Carnegie, Pa.; Fontana, Calif.; Gary, Ind.; Hamilton, Ontario, Canada



A New Development that's 37 Years Old

When you cut a hole in the shell of a pressure vessel you of course weaken it. But, how much?...or, to put it another way, how much reinforcement is necessary to make the shell surrounding an opening as strong as any other part of the shell?

In the old days of low pressure and over-sizing that hadn't been much of a problem. But when pressures began to climb fast (about 1915) it became a tough one.

Taylor Forge had already begun to relish problems like this: had pioneered the forged steel flange; was playing a major part in the development of flange and piping standards. So it isn't at all surprising that Taylor Forge again came forward with the solution — the first seamless forged steel pressure vessel nozzles.

The research and testing that Taylor Forge put into designed pressure vessel outlets dates back to the riveted, sweep nozzles that are still giving safe, satisfactory service. But as riveting gave ground to welding, still more critical analyses were made to determine the exact requirements of nozzles designed for welding.

These many years of tests and studies were fully summed up in a paper entitled "Effects of Openings in Pressure Vessels" which was presented by the late J. Hall Taylor and Professor E. O. Waters at the June 1933 meeting of the ASME. It is still authoritative in this field.

Yes, a new idea that is 37 years old! So thoroughgoing was its first development—so critical the steps taken to maintain its leadership—that today Taylor Forge Seamless Nozzles and Welding Necks are the standards of the entire pressure vessel and piping industry.

An episode in the story of Taylor Forge leadership in designed piping

new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

Lubricant-Seal for Threaded Fittings

Z-7

C. H. DRAGERT COMPANY, Chalk Hill Rd., Dallas, Texas, has developed "Big D Dope"—a lubricant-seal for all types of threaded fittings which is claimed to afford considerable savings on materials and manpower.

Manufacturer emphasizes that a single application of the new thread compound provides permanent lead-plating, permitting repeated, easy and quick assembly and disassembly of any size threaded connections without re-doping and without damage to threads.

Applications include nuts and studs on all types of pumps and engines, large plug valves, fork-lift and elevator guide channels, open-worm gears, hydraulic lines, drill pipe and tool joints, line grooves on sheaves, and as a packing sealer and steel-cable lubricant.

Compound combines 90% freshly disintegrated metallic lead, with 10% of a special oil that keeps atomized lead in full suspension. Manufacturer states: "We proved our formula by making nine round trips of a string of drill pipe with a single "Big D" doping. It also easily withstood 25,000 lb torque."

Free pint samples are available through the manufacturer. It is packed in 2 lb pails (85 cents/lb); 5 lb (75 cents/lb); 40 lb (37 cents/lb) and 80 lb (36 cents/-lb).

trickle?

or torrent?

the Ingersoll-Rand MOTORPUMP

gives you the capacity you need... the value you want!

When you want to move a few gallons of fluid . . . or up to 2800 gpm with heads to 650 feet, it will pay you to investigate the Ingersoll-Rand MOTORPUMP.

The MOTORPUMP is compact and efficient. Size-for-size it stands out by consistently moving more gallons per kilowatt of power used.

In value, too, the MOTORPUMP is a best buy. From impeller locknut to motor bearings, every MOTORPUMP is designed from experience to do the toughest job—for the longest time—at the lowest maintenance cost.

Now, when operating costs must come down, investigate the Ingersoll-Rand MOTORPUMP and its applications in your plant. Call your nearest I-R branch for complete information, or write direct to:

Ingersoll-Rand

CAMERON PUMP DIVISION

11 BROADWAY, NEW YORK 4, N.Y.

MOTORPUMP

•End-to-end, top-to-bottom, the MOTORPUMP is crammed with design features and construction advantages that make it a better buy.

9-107A

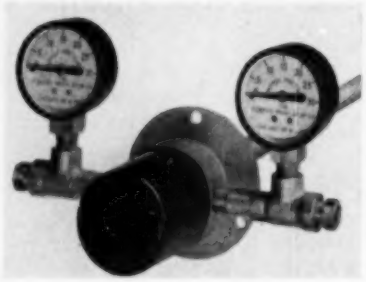
new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

Pneumatic Temperature Control

Z-8

THE POWERS REGULATOR CO., Dept. SIA, 3400 Oakton St., Skokie, Ill., announces that a new and inexpensive non-bleed pneumatic temperature control is now available for operation of such devices as diaphragm valves, damper motors and other types of control equipment.



Known as the Powers "Limitem," it is a differential expansion type control designed for precision regulation of heating, cooling, ventilating, air conditioning, dew point control and industrial processes.

Temperature range of the new control is from 35 to 135 F. The concealed graduated dial permits quick, easy adjustment. Sensitivity can be adjusted from ⅛ to 2 psi per 1 degree temperature change—gradual acting.

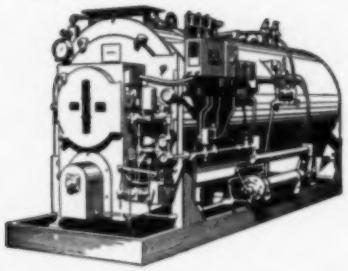
Body OD is 1¾" and averaging bulb length 18" with ⅜" pipe or flange connection. Simple design and rugged construction provide dependable operation. Available with direct action only. Passage of air pressure is increased as temperature rises.

'O' Rings Replace Leather Cups in Two Valve Lines

Z-9

ATLAS VALVE COMPANY, 280 South St., Newark 5, N. J., announces that hard rubber 'O' rings, precision molded to close tolerances, are replacing leather cups in valves manufactured by the company.

Units redesigned for the 'O' ring seals are the Type 'E' Reducing Valve and the number 214 Float Valve. The manufacturer states that the new rings provide longer service life, better sealing, and are more satisfactory for use at higher temperatures. Fric-



An Engineer Tells WHY Continental Boiler Tube-Sheets Have Long Service Life

"Pictured here is the rear tube-sheet of a packaged boiler, where the combustion gases at high temperature emerge from the furnace and sweep over the tube-sheet to enter the return tubes. Tube-sheet and tube ends are exposed to intense heat which may overheat the metal and cause serious damage.

"Tough problem . . . but the Continental features a simple solution:

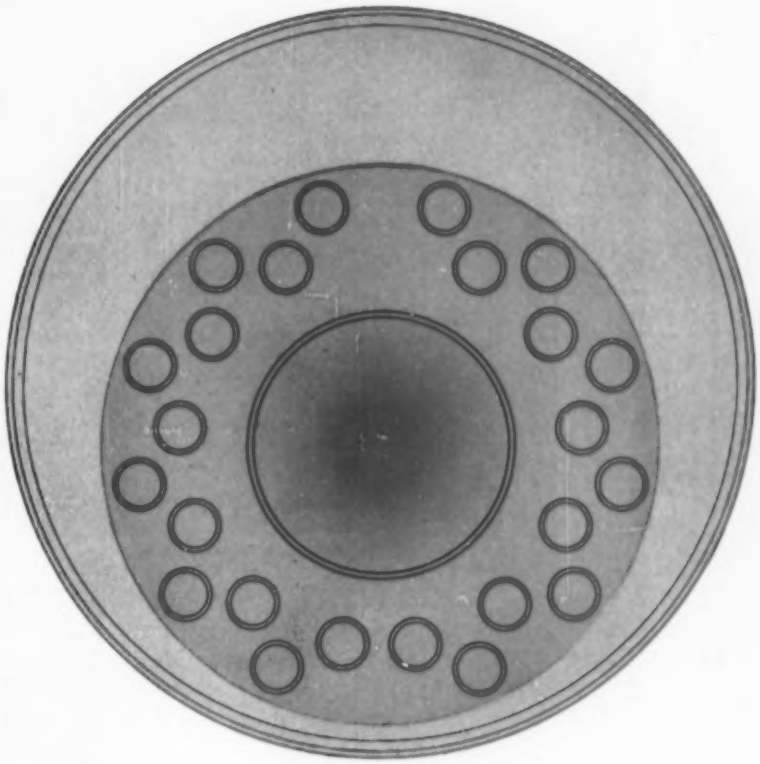
"(1) It provides equal flow of combustion gases to all return tubes so that all heating surfaces are equally effective.

"The Continental Boiler's two-pass design enables the hot combustion gases to transmit heat uniformly to the tube-sheet and tubes, thus making all surfaces equally effective.

"(2) The Continental Boiler provides adequate water circulation by proper arrangement of furnace and return tubes.

"It is essential that the large amount of heat carried to the tube-sheet and tube ends be quickly transferred to and absorbed by the boiler water. Sluggish circulation caused by close packing of return tubes may cause a heat block — with resultant overheating and damage to the metal.

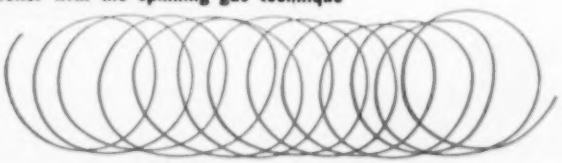
"Note the symmetry of tube layout in the Continental Boiler. There is uniform distribution of heat over the entire tube-sheet . . . equal loading of all return tubes . . . free and balanced water circulation space — with single pass of return tubes."



EFFICIENCY — guaranteed over 80% for all sizes of Continental Boilers, from 20 to 500 hp. Dependable, trouble-free operation — for steam heating at pressures from 15 to 250 pounds . . . or for hot water heating at low or high temperatures.

Write for Bulletins BE3 and BE4.

CONTINENTAL . . .
the boiler with the spinning gas technique



CONTINENTAL
Automatic Boiler
Manufactured by:
BOILER ENGINEERING & SUPPLY CO., INC.
Phoenixville, Pa.

new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

tion in piston operation in the 'E' Valve is appreciably reduced.

The Type 'E' is a spring loaded, diaphragm operated reducing valve for water, air and oil. Number 214 is an auxiliary (pilot) operated float valve for water pressures from 20 to 200 psi. Here the 'O' rings are used for tight seal on the main valve and the auxiliary valve.

Asbestos Insulating Rope

Z-10 North American Asbestos Corp., Board of Trade Bldg., Chicago 4, Ill., has introduced "Caposite" pure asbestos rope for the effective flexible insulation of curved and irregular piping, bends, fittings, valves, expansion joints, engine exhausts and similar uses including furnace door packing.

This new rope is 100% chemically pure long-fiber Amosite asbestos rovings, twisted together to the correct diameter and retained within a braided reinforcing jacket of asbestos yarn. It contains no organic reinforcing fibers. It is one-half to two-thirds lighter; heat transfer is correspondingly less; and size for size, there are from 2 to 3 times as many lineal feet per pound. The manufacturer states that Caposite Rope cannot rot or deteriorate, insulates effectively up to 1200 F, and can be removed and reapplied repeatedly at temperatures to 750 F. It is available in 100-ft coils, ½" to 2" diameter.

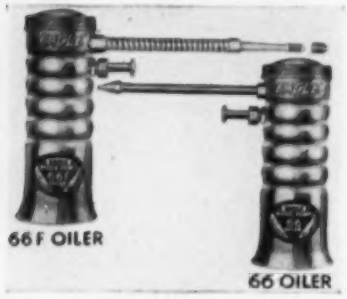
Homeowners and plant managers bought more than 1,103,000,000 gallons of our fuel oil last year—more than ever before.

CITIES SERVICE

A Growth Company

All-Purpose Oilers

Z-11 EAGLE MANUFACTURING COMPANY, Wellsburg, West Virginia, has introduced newly designed All-Purpose "Super" Pump Oilers featuring larger capacity, a new flanged base to prevent tilting, and new brass spout tip.



The redesigned #66 Oiler has a seamless brass spout with detachable brass cone-shaped tip to permit easy oiling, while the new #66-F features an asbestos-lined flexible steel spout with threaded brass cap which seals the spout when not in use.

Seamless brass bodies, machine-ground brass plunger and bronze ball valves are other features of both oilers. Each now holds 6 ounces of oil and will pump one drop or a full stream. Oil can be discharged up to 25 feet. When filling with oil, the pump mechanism is not removed. All parts are replaceable.

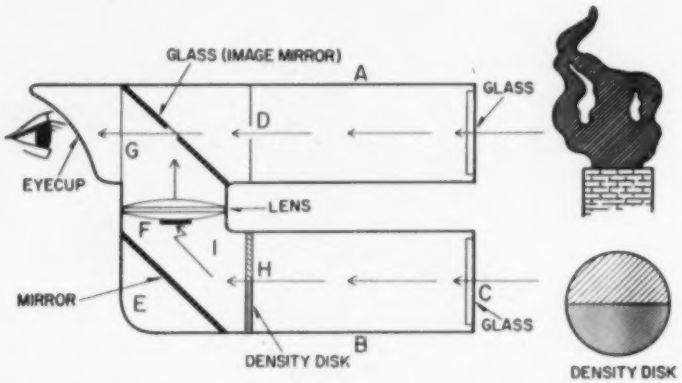
Pre-Heater Incorporated In Boiler Feed Systems

Z-12 CYCLOTHERM DIVISION UNITED STATES RADIATOR CORPORATION, 157 E. First St., Oswego, N. Y., has introduced a new boiler feed system, incorporating a pre-heater that operates on steam from the boiler, for use in conjunction with Cyclotherm and other steam boilers.

The new units automatically maintain boiler feedwater between 190 and 200 F. Tank sizes on the units range from 30 to 540 gallons. They will supply from 280 to 2800 gallons of pre-heated water every hour.

Pre-heated boiler water makes it possible to lengthen boiler life by eliminating stresses caused by low temperature feedwater entering the already heated boiler shell. Pre-heating makeup water also makes it easier for the boiler to maintain pressure during peak load periods and reduces boiler scale.

A perforated tube inserted horizontally in the feedwater tank is connected to the steam supply. The unit is thermostatically controlled so that steam is allowed to enter the unit only when the temperature falls below a predetermined point. A thermostatic bulb filled with a pressure-sensitive fluid controls a flexible bellows that mechanically opens and closes the valve, varying the opening or completely closing it.



Schematic drawing shows how the MSA Smokescope is used to determine density of smoke rising from stack. Observer views smoke through apertures "C," "D," and "G" in barrel "A." Light from an area adjacent to the stack is transmitted through the reference disc "H" in barrel "B" to the surface of mirror "E." From this mirror, an image of the reference disc is projected through lens "F" onto the image mirror. Here it can be compared with the smoke seen through apertures. The center portion of the disc is blocked by an opaque disc, labeled I.

Smoke Density Determination

Z-13 MINE SAFETY APPLIANCES COMPANY, Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa., has made available a new instrument to aid in compliance with smoke control laws, called the "MSA Smokescope."

The instrument can be used to determine whether or not fuel is being properly burned to gain full Btu advantage, since excessive smoke indicates it is not. In this respect, industry can put the Smokescope to work for greater efficiency in addition to improving its community relations through air pollution.

Here's how it works: light from the area adjacent to the stack is transmitted through one tube of the instrument and through the reference film disk inside the tube to a front surface mirror. Reflected by the mirror, it passes through a lens to an image mirror where it may be directly compared with the smoke as seen through the other tube of the instrument. The reference film disk is placed at the focal point of the lens, and thus has the effect of placing the light rays reaching the eye in a parallel position. Film area is small and acts as a point source.

The lens used to project a virtual image of the reference film disk also serves to intensify the light in the reference standard optical path, compensating for the light loss at the reflecting surfaces.

Need for such an instrument arose from the difficulties surrounding the old method which employed the "smoke chart." While far from perfect, the chart system is the foundation of all past experience in gaging amounts of smoke and the basis for all existing smoke-control legislation. But it has distinct disadvantages.

These disadvantages are overcome in the Smokescope, which eliminates possible interference of ambient light because the user views the smoke through apertures which limit the field of vision to the subject. And there is no necessity to shift the eye from smoke to chart, since the chart, in the form of the reference film disk, appears against the smoke being viewed.

Float Type Moisture Trap

Z-14 THE V. D. ANDERSON COMPANY, 1935 West 96th St., Cleveland 2, Ohio, has introduced a new float-type moisture trap to fill the need for a simplified, low cost, float trap on air, gas and steam applications.

The traps are suitable for operating pressures up to 200 psig and have the unique feature of an optional inlet for ease of installation.

The unit consists of a stainless steel valve and seat, and lever, plus a durable copper hide float inside a cast semi-steel case. A stainless steel float can be furnished when specified. The valve is opened by liquid raising the float and closed when float drops the liquid level. No. 81 traps are furnished with either ½" or ¾" connections.

Shock Resistant Gasket Mounted Valve

Z-15 RIVETT LATHE & GRINDER, INC., Brighton 35, Boston, Mass., has developed a new gasket mounted, solenoid operated, 4-way valve, that is fully shock resistant.

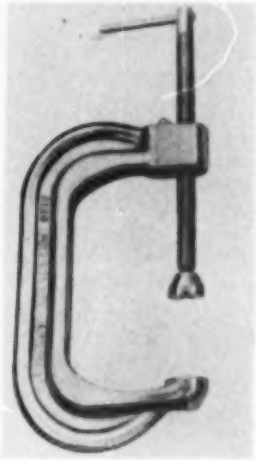
Impact and shock are eliminated by the use on the valve spool of a scalloped design, which opens or closes gradually increasing or decreasing areas to the ports as the spool is moved left or right.

Metering grooves built into the spool, plus a choke block assembly to control the speed of the spool, aid in allowing the flow to enter and leave the valve with an easier, smoother action; and permit use of the valve as a de-compression valve and a 4-way valve in one.

Lower pressure drop and less back pressure are two additional features that make the new valve unique. Lower pressure is attained by designing larger, unrestricted passages, permitting a greater flow area. This design means greater efficiency, longer life, less wasted horsepower and less shock.

Fast Acting "C" Clamp

Z-16 JERGENS TOOL SPECIALTY COMPANY, 712 East 163rd Street, Cleveland, Ohio, announces a new fast acting "C" clamp made of aluminum alloy.



According to the manufacturer, the new clamp features completely replaceable parts including a copper plated screw with handle, fast-action nut, pressure spring and copper plated shoe. The clamp operates lightning fast by simply pressing the quick acting nut which permits the screw with shoe to drop to the work for instant tightening action. Made of aluminum alloy, the Jergens "C" clamp is light, durable and resists weld splatter adherence. It's an excellent conductor of electricity for ground clamps.

Abrasive Disc

Z-17 MINNESOTA MINING AND MANUFACTURING CO., 900 Fauquier St., St. Paul 6, Minn., has introduced a new depressed center abrasive disc for rough grinding, combining increased cutting ability and safety.

Called the 3M Type "G," the disc is made of aluminum oxide mineral in a reinforced fabric and resin construction which contributes to faster cutting and safer operation. It is designed for heavy weld removal, slotting and portable cutoff operations. Both sides and the periphery of the disc can be used for cutting.

The new disc is available in grit 24 in two sizes—7" and 9¼"—in "R" hardness. A speed of 5500 rpm is recommended for the larger size and 6000 rpm for the smaller size. Other specifications include a ⅞" arbor and an overall thickness of ¼".

Portable Masonry Hole Cutting Machine

Z-18 MOLCO DRILLING MACHINES CORP., 1100 Twentieth St., N.W., Washington, D. C., has introduced an entirely new masonry hole cutting machine, which is portable, high speed, and light weight.

It uses a self-sharpening diamond drilling bit to cut holes ½" to 10" in diameter through hard aggregate, including any steel reinforced building material, to a depth of 18" (deeper holes may be drilled by placing an extension shaft on the bit). Drilling time of a six inch diameter hole in one foot of concrete is less than two minutes. The machine is available in two models, 1 hp and 2 hp.

Plug of reinforced concrete is removed from the 12" slab after running time of less than 4 min. Prices of the 275 lb units are $385 for the 1 hp model; $485 for the 2 hp; and $25/diameter inch for the bits.

News for the South and Southwest (continued)

(*Starts page* 8)

Niagara Filters

THE NIAGARA FILTERS DIVISION of AMERICAN MACHINE AND METALS, INC., announces that ALLAN EDWARDS, INC., TULSA, OKLA., has been appointed sales representative in Oklahoma, Arkansas, western Kansas and northern Texas. Sales headquarters are located at 2445 South Jackson, Tulsa.

Parker Appoints Flow Engineering Co., Ala.

Appointment of FLOW ENGINEERING SALES COMPANY, 405 Woodland Drive, BIRMINGHAM 9, ALABAMA, as authorized distributor is announced by THE PARKER APPLIANCE COMPANY, Cleveland, Ohio.

According to R. D. BEATTY, JR., general manager, Flow Engineering will maintain stocks of Parker fittings as well as tube fabricating tools, for prompt servicing of customer needs in the Alabama area.

Parker Names Florida Metals

Appointment of FLORIDA METALS, INC., as authorized distributor for hydraulic Hoze-lok fittings and hose assemblies is announced by THE PARKER APPLIANCE COMPANY, Cleveland, Ohio.

Florida Metals has warehouses in Tampa, Jacksonville, and Miami.

According to R. P. CHARLES, vice-president in the general office at 222 N. 12th St., Tampa, the company will maintain stocks of Hoze-lok fittings at all three points along with established stocks of tube fittings for prompt servicing of customer needs.

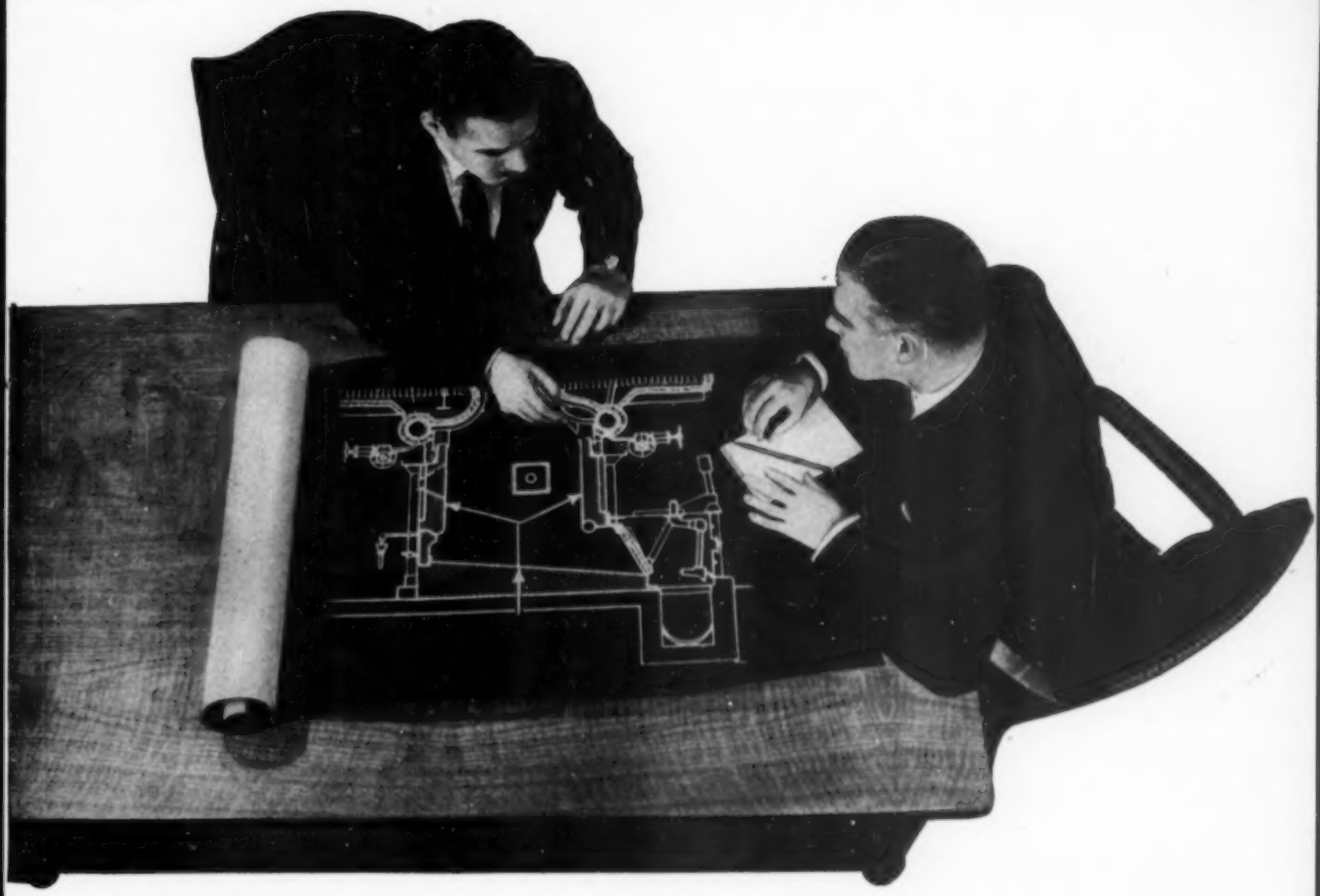
New Dealers for Clark's Michigan Line—South, S.W.

New dealers appointed to sell and service the Michigan line of excavator cranes and tractor shovels, products of the Construction Machinery Division of CLARK EQUIPMENT COMPANY, include LINDER, COX AND COMPANY, LAKELAND, FLA., for central Florida; DEMPSTER BROTHERS, INC., KNOXVILLE, TENN., for eastern Tennessee and northwest Georgia; STANDARD EQUIPMENT AND SUPPLY COMPANY, NORTH LITTLE ROCK, ARK., for most of Arkansas; POWER EQUIPMENT COMPANY, LUBBOCK, TEXAS, for northwest Texas; and WILSON EQUIPMENT COMPANY, ODESSA, TEXAS, for west central Texas.

Hagan Elects Weatherly

ROBERT S. WEATHERLY, of BIRMINGHAM, ALABAMA, has been elected a director of HAGAN CORPORATION and its subsidiaries, Hall Laboratories, Inc., Calgon, Inc., and The Buromin Company.

A management consultant in Birmingham since 1952, Mr. Weatherly was general sales manager for the Monsanto Chemical Co., St. Louis, Mo., from 1939 to 1952. Prior to that he was vice president of the Swann Chemical Co., Birmingham. He is a member of the Chemists' Club, New York City, and a graduate of the University of Alabama, class of 1920. He also attended the Harvard University Graduate School of Business Administration.



PROMINENT PUBLIC UTILITY

Cuts ashpit maintenance with B&W Refractory Concretes

A trial installation of B&W Refractory Castable "A", a 2600 degree refractory concrete, was made in one boiler ashpit. To date this castable has given 25 months more maintenance-free service than the refractories previously used.

Results of this first trial were so encouraging that another ashpit, shown in the drawing above, was lined with B&W Refractory Castable "A". In this installation the two opposing high velocity water sprays cut refractories life two ways. First, water splattered on the hot walls (about 1800F) caused spalling. Second, the high velocity water jets had an abrasive effect on the floor refractories.

Here's the report: "After 20½ months service, B&W's Castable "A" lining was still in excellent condition—far superior to the refractories used before."

On the basis of these trials three other boiler ashpits have been lined with this 2600 degree castable.

In addition to ashpit linings, B&W Refractory Castable "A" is widely used in boilers for baffles, hearths, door linings, special shapes, repairing eroded brickwork and forming pier walls in stoker-fired boilers.

B&W Castable "A" is only one of a line of B&W Refractory Concretes which cost-conscious boiler operators are putting to increasing use in many different applications. These B&W Concretes may help you cut installation costs and lengthen furnace life. Consult your B&W Field Engineer.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

B&W REFRACTORIES PRODUCTS—B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • **OTHER B&W PRODUCTS**—Stationary & Marine Boilers and Component Equipment... Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

R-1793A

Virginia Attracts Chemical Industries

Chemical industries seeking new plant locations will have access to detailed information on VIRGINIA'S advantages in a study just completed for reference and promotional use.

"THE CHEMICAL INDUSTRY GROWS WITH VIRGINIA," a 36-page brochure, has been published by the area development department of the Virginia Electric and Power Company as a joint project with the State Unemployment Compensation Commission, Department of Labor and Industry, Division of Planning and Economic Development, Water Control Board, and the State Chamber of Commerce. Each section of the brochure was prepared by a specialist on the particular subject.

The study fills a long standing need, according to Walter I. Dolbeare, vice president in charge of area development for Vepco. The chemical industry is now the largest single industrial employer in Virginia and is steadily expanding, he said. The data in this booklet provides complete information for an industrial prospect which in the past had to be compiled from many sources.

Included are sections dealing with the chemical industry's recent growth, the factors favoring continuing expansion, labor potential, water resources and water pollution control.

Tables of statistical data give tabulations dealing with employment, earnings, production, railroad carload traffic, and waterborne shipping.

Maps show the dispersion of the chemical industry, new plants and plant additions, transportation facilities, location of electric and natural gas transmission lines, colleges and universities, and distribution of Virginia's labor potential.

Initial distribution of the brochure began with mailings to the heads of interested governmental agencies, Chambers of Commerce, industrial development departments of railroads, and many others. Copies will also be made available to any industries which are considering Virginia as a location for further expansion.

Rockwell Mfg. Co.—Charlotte

ROCKWELL MANUFACTURING CO., Pittsburgh, Pa., recently opened a new district office for its meter and valve division in CHARLOTTE, N. C. GEORGE A. CUNNINGHAM, gas products sales manager and a former meter and valve division Florida sales representative, has been appointed district manager.

Ozier Represents National Radiator Co.—Alabama

JOHN D. OZIER, 1324 Meadow Lane, BIRMINGHAM, ALABAMA, is now covering the state of Alabama for the heating products of THE NATIONAL RADIATOR COMPANY, Johnstown, Pa. He is working out of the company's branch sales office in RICHMOND, VIRGINIA.

Allis-Chalmers—W. Va.

THE WEST VIRGINIA ARMATURE COMPANY, BLUEFIELD, W. VA., has been appointed a certified service shop for ALLIS-CHALMERS motors and control equipment in portions of West Virginia, Virginia and Kentucky.

Bailey Meter Co. Moves to New Offices at New Orleans

The New Orleans District Office of BAILEY METER COMPANY has moved to larger quarters at 909 S. Jefferson Davis Parkway, NEW ORLEANS 25, LA.

S. G. Dukelow

Under the managership of S. G. DUKELOW, the office is staffed by instrument engineers J. M. BEVAN and D. J. FOGARTY, specialists in flow measurement, combustion and control applications. Territory includes the eastern half of Louisiana, southern Arkansas, the southern three-quarters of Mississippi, and the counties of Mobile and Baldwin in Alabama.

Southwestern Gas & Electric Elects Welsh and Wilkes

SOUTHWESTERN GAS & ELECTRIC CO., SHREVEPORT, LOUISIANA, recently elected FRANK M. WILKES chairman of the board, and J. ROBERT WELSH president.

Mr. Welsh, a top executive with Southwestern for the past 14 years, moved up to the office of president from his position as vice president and general manager. He formerly served as superintendent of power, and as superintendent of operations.

Mr. Wilkes retired as president of Southwestern on November 1, after 46 years of service in the electric industry. As chairman of the board he is serving in an advisory capacity.

News for the South and Southwest (continued)

Chain Belt—Charlotte

CHAIN BELT COMPANY, Milwaukee, Wis., announces the opening of a new district office at 501 E. Morehead St., CHARLOTTE, N. C., under the supervision of RAY TRAYLOR.

Mr. Traylor, who has been trained by the company as Sales Engineer, has represented Chain Belt in the field for the past three and a half years.

Belgian Electric—S.W.

BELGIAN ELECTRIC SALES CORPORATION, 40 East 49th Street, New York City, exclusive United States representative for ACEC electric motors and SADI gearmotors, announces the appointment of the W. M. SMITH ELECTRIC COMPANY as Southwest sales representative, with headquarters at 3200 Grand Ave., DALLAS, TEXAS. ALLEN M. GRAYSON is general manager.

From its offices and plants in Dallas, Ft. Worth, Houston, Lubbock and Harlingen, Texas, the W. M. Smith Electric Company serves Southwestern industry by selling, stocking and servicing electrical equipment. The Smith sales organization includes ten salesmen, operating out of the various Texas offices, and has additional representation in Shreveport and New Orleans, La.; Tulsa and Oklahoma City, Okla.; Pine Bluff and Little Rock, Ark.

Carey Expansion—Atlanta

Purchase of a tract of land near ATLANTA, GEORGIA, by the PHILIP CAREY MFG. COMPANY, Cincinnati, Ohio, for construction of additional manufacturing facilities, was announced recently.

This year Carey built a new warehouse and sales office in Atlanta, and construction of a new plant in this area will augment distribution of their building and industrial products in the South and Southeast. The new manufacturing site is in the Fulton industrial district near the Chatachoochee River.

Carey also has a plant at HOUSTON, TEXAS, where an expansion program is nearing completion.

Reichhold Chemicals Opens N. C. Formaldehyde Plant

REICHHOLD CHEMICALS, INC., has recently completed a formaldehyde producing installation at its plant in CHARLOTTE, N. C.

The unit will have an annual capacity of 25,000,000 pounds. Reichhold also has a formaldehyde unit at Tuscaloosa, Ala.

Formaldehyde is widely used in the manufacture of a broad range of products. Combined with phenol, it provides phenol-formaldehyde laminating resins as well as resins for surface coatings and shell molding and casting in the foundry industry. Combined with urea, formaldehyde is made into resins for surface coatings, plywood adhesives and paper chemicals.

Chelsea Fan—Kansas City

CHELSEA FAN AND BLOWER CO., INC., 639 South Ave., Plainfield, N. J., announces the appointment of GEORGE C. BLEW as their representative in KANSAS CITY, MO.

George Blew

Mr. Blew, who was formerly service manager at the company's home office, will now cover the territory including Kansas, Nebraska, Oklahoma, Northern Texas, Western Missouri, and Fort Smith, Arkansas.

Rockwell Names Hoyt—Ga.

JOHN G. HOYT, JR., assistant sales manager of ROCKWELL MANUFACTURING COMPANY'S water meter division, has been appointed ATLANTA, GEORGIA, district manager for the company's Meter and Valve Division.

John G. Hoyt, Jr.

Mr. Hoyt joined Rockwell in 1941, when the company acquired National Meter Company, with which he had been affiliated in Houston since 1939. He served as district supervisor of water meter sales in Houston until 1953 when he went to Pittsburgh.

Born in Bogalusa, La., Mr. Hoyt attended Southwestern College in Memphis, Tenn., and Centenary College in Shreveport, La.

News (continued)

Jeffrey Mfg. Appointments

THE JEFFREY MANUFACTURING COMPANY, Columbus, Ohio, has recently announced several staff appointments.

TRAVERS W. NELSON, former sales engineer in the Pittsburgh District Office, is now district manager of the firm's office at 507 Exchange Bldg., JACKSONVILLE, FLORIDA. His new territory covers the Carolinas and parts of Georgia and Florida.

ROBERT M. DUNN has been transferred from the student training program to the post of sales engineer to the district office at 1848½ West Cumberland Ave., KNOXVILLE, TENNESSEE, to cover parts of Tennessee, Virginia, and Kentucky.

VERNON L. EKBLAD, a conveyor engineer in the company's Columbus headquarters, has been transferred to the HOUSTON, TEXAS, office in the City National Bank Building, serving Arkansas and parts of Texas and Oklahoma.

WALTER J. HULSEY has been named manager of the Conveyor Division of the BIRMINGHAM, ALABAMA, office, where he has been located for many years. The Birmingham District Office is at 2210 Third Ave., North.

Staff Changes—Georgia Power

GEORGIA POWER COMPANY has announced several changes in staff assignments. L. B. LOCKLIN, superintendent of production, and A. B. GREENE, JR., superintendent of generating plant construction, have assumed the duties of B. W. SINCLAIR, recently retired manager of production.

The new Sinclair dam on the Oconee River near Milledgeville, Georgia, was named for Mr. Sinclair, who had served with the company for 42 years.

Mr. Locklin will have general charge of the operation and maintenance of all power plants in the system. Mr. Greene will superintend the construction of all generating plants, transmission lines and substations.

R. S. CAUSEY has been named assistant superintendent of production, and W. S. BRADLEY is assistant superintendent of construction. J. T. HANIE, field engineer in the line construction department, is now supervisor of all construction projects.

New SIPMHE Chapter—Texas

C. J. CARNEY, JR., Executive Director of the SOCIETY OF INDUSTRIAL PACKAGING AND MATERIALS HANDLING ENGINEERS, with national headquarters in Chicago, met with a delegation of over 50 industrial packaging and materials handling engineers on September 14 in the Auditorium of Texas Instruments, Inc., DALLAS, TEXAS.

The purpose of the meeting, arranged by R. H. Rodgers, Jr., of Texas Instruments, Inc., was to organize the 17th Chapter in the national network of SIPMHE, technical society dedicated to advancing the knowledge and interests of industrial packaging and materials handling operations in all fields of industry. The new group is known as the Dallas-Fort Worth Chapter.

Crowe Represents Flexonics

The appointment of LEWIS M. CROWE COMPANY, Station C—P. O. Box 7387, ATLANTA 5, GEORGIA, as exclusive representative for Flexon corrugated expansion joints, was recently announced.

Flexon Expansion Joints, widely used to absorb pipeline expansion, are manufactured by FLEXONICS CORPORATION, original U. S. fabricator of Stainless Steel bellows, the pressure carrier of the corrugated expansion joint.

G.E. Provides Power for Louisville Flood Control

Electric power will be called into action if and when LOUISVILLE, KENTUCKY, is again threatened by the rampaging flood waters from the Ohio River.

Started in 1947, under the direction of the U. S. Army Corps of Engineers, Louisville's flood control program now comprises thirteen pumping stations built at a total cost of more than $24 million dollars. In addition to the pumping plants, 12.8 miles of levy embankment and 4.5 miles of concrete wall, which measures from a few feet to 30 feet in height have been constructed.

Electrical apparatus supplied by the GENERAL ELECTRIC COMPANY provides the "muscle" strength for the pumping stations to effectively handle future flood waters. The newest station, called the Beargrass Creek plant, now under construction, will be the largest pumping station in Kentucky capable of handling 2,830,000 gallons of flood water per minute. The Beargrass plant under flood conditions will be able to pump as much water in a half hour as is normally consumed by the entire population of Louisville in a day.

Beargrass will have two 10,000 kva banks of three G-E transformers each rated at 3333 kva as well as metal clad and low voltage switchgear. The drive for the pumps includes six 3,000 hp, one 2,500 hp, and one 600 hp motors.

In the past the Louisville area's flood stage has been exceeded on an average of once every year and a half. Three major floods have occurred in the last 15 years and these together with some minor floods caused damage totaling more than $251 million dollars, at current price levels. The worst of these floods occurred in 1937, when 17,600 acres were inundated.

News (continued)

Foundry Service Co., Ala., Represents Ironton Fire Brick

FOUNDRY SERVICE COMPANY, 2321 Twenty-Ninth Ave. No., Birmingham, Ala., is a new representative for The Ironton Fire Brick Company, Ironton, Ohio. They will handle accounts in ALABAMA, GEORGIA, and SOUTH CAROLINA. A complete warehouse stock will be maintained for prompt shipments to foundries, steel mills, chemical plants, boiler plants, paper mills, and all other industries requiring refractory materials.

Allen Joins Master Tank & Welding Co.—Dallas, Tex.

WALTER L. ALLEN has joined MASTER TANK AND WELDING CO., DALLAS, TEXAS, as traveling sales representative in Texas and New Mexico. Mr. Allen is a native Texan and is well known in the butane industry. He will have his headquarters in Luling, Texas.

G-E Names Leake—La., Miss.

Appointment of WILLIAM STONE LEAKE to succeed HARRY H. BLAKESLEE as Manager of the LOUISIANA-MISSISSIPPI field sales area for the GENERAL ELECTRIC COMPANY'S Apparatus Sales Division was announced recently by C. L. REDD, Manager-Southeastern District. Mr. Leake's appointment was effective September 1, at which time Mr. Blakeslee retired after 43 years' service with the company.

Leake, with headquarters in New Orleans, will be responsible for the sales and engineering force throughout the two-state area, which includes four territorial sales offices located in Alexandria, La.; Baton Rouge, La.; Gulfport, Miss.; and Jackson, Miss.

Leake joined the General Electric Company in 1924 following graduation from Tulane University where he received a Bachelor's degree in Mechanical and Electrical Engineering. After completion of G-E's test and sales course, he was assigned to the New Orleans office where he has served throughout his G-E career as a sales engineer and since March of this year, as Manager-Sales of that office.

Richard K. McCoy

Alco Appoints Southern District Sales Manager

The appointment of RICHARD K. MCCOY of WASHINGTON, D. C. as southern district sales manager for AMERICAN LOCOMOTIVE COMPANY was announced recently. McCoy will make his headquarters in Alco's Washington office, and will be responsible for sales of the company's commercial products in Southern and Southeastern States.

Award for Hughes of Clinchfield Coal, Va.

ROBERT H. HUGHES, president of CLINCHFIELD COAL CORPORATION, DANTE, VIRGINIA, has been named to receive the Pi Tau Sigma Richards Memorial Award.

The award, which is administered by the Board on Honors of The American Society of Mechanical Engineers, is conferred annually on a mechanical engineer 45 years of age or younger, for "outstanding achievement in mechanical engineering within 20 to 25 years after graduation." It will be presented at ASME's annual meeting in New York, November 29-December 3, 1954.

Selas Corp.—St. Louis

An expansion in the field sales organization of SELAS CORPORATION OF AMERICA, Philadelphia, heat and fluid processing engineers, is announced with the formation of a ST. LOUIS sales zone, headed by ROBERT M. BRECKENRIDGE, who will make his headquarters at 8643 Brookshire Lane, University 24, Missouri.

Mr. Breckenridge has been with Selas for the past seven years, where, in a sales engineering capacity, he has actively participated in the design and engineering of a number of heat processing developments.

Lion Oil Dedicates New Barton Plant—Louisiana

THE BARTON PLANT, LION OIL COMPANY'S new petrochemical installation at LULING, LA., was formally dedicated late in October.

The plant is located on a 1,400 acre plot on the west bank of the Mississippi River, 14 miles upstream from New Orleans. The Barton Plant manufactures nitrogenous chemicals for agriculture and industry, using natural gas, air and water as raw materials. It has capacity for the daily production of approximately 300 tons of anhydrous ammonia (about 82% nitrogen), a large portion of which is processed into pelleted ammonium nitrate for use as fertilizer. This material is also used by fertilizer blenders as the nitrogen content in mixed fertilizers. Waste carbon dioxide from the ammonia manufacturing process is utilized at the plant in the manufacture of about 42 tons per day of solid (dry ice) and liquid carbon dioxide.

Manufacturing operations at The Barton Plant were begun late in May of this year. About 18 months were required for construction of the installation. Chemical Construction Corp. of New York was the engineer-architect and The Lummus Co. was the prime construction contractor.

Wiley Equipment Company Formed in Atlanta, Ga.

The newly-formed WILEY EQUIPMENT COMPANY, 710 Tenth Street, ATLANTA, GA., has been appointed to sell and service the line of fork trucks, straddle carriers and other materials handling equipment manufactured by the Industrial Truck Division of CLARK EQUIPMENT COMPANY.

Wiley Equipment Company was recently formed by EUGENE V. WILEY, president. Until recently Mr. Wiley was vice-president and sales manager of the M-H Equipment Company, Birmingham, Ala., and since 1952 had been manager of that company's Atlanta, Ga., branch. Previous to this association Mr. Wiley was on Clark's sales staff with duties in Tennessee.

D. E. WHALEY is head of the service department, and I. L. PENDER is parts manager.

Lynch of Atlantic Steel Receives SAM Award

R. S. LYNCH, president of ATLANTIC STEEL COMPANY, ATLANTA, GEORGIA, has been presented the Society for Advancement of Management's Human Relations Award for 1954. The presentation took place at the Society's recent annual Management Conference in New York City.

This award, instituted by the Society in 1944, is given annually in recognition of an outstanding contribution to the advancement of human relations. The selection is based upon the recommendation of a committee of industrial executives representing the various chapters of the SAM throughout the entire country.

Norton Appoints Cramer, S.W.

BRUCE CRAMER has been appointed Refractories Engineer by NORTON COMPANY for a new territory consisting of the principal parts of TEXAS, OKLAHOMA, and ARKANSAS, and a small part of LOUISIANA.

Bruce Cramer

A graduate of Colgate University, Mr. Cramer first came with Norton Company in 1952 following service with the U. S. Marine Corps. Prior to his present appointment, he was a member of the Refractories Sales Engineering Department. Mr. Cramer will make his home in Houston, Texas.

Femco—W. Va. & Carolinas

FEMCO, INC., Irwin, Pa., has announced the appointment of JACK HELTON as sales engineer in WEST VIRGINIA and the CAROLINAS. Mr. Helton will make his headquarters in Bluefield, Virginia.

Femco, Inc., pioneers in electronic communication systems, has recently expanded its line to include many different services for automation of equipment and processes in mining and industry.

National Supply—St. Louis

G. L. BADER, who has had more than 25 years in the diesel engine industry, has been appointed a special representative of the Engine Division of THE NATIONAL SUPPLY CO., manufacturer of Superior and Atlas engines.

He will be concerned principally with engines for natural gas and petroleum pipeline use, but will also handle marine and stationary engine applications in the vicinity of his headquarters at ST. LOUIS, MO.

News (continued)

Johnson Bronze Co.—Atlanta

JOHNSON BRONZE COMPANY, New Castle, Pa., announces the appointment of W. O. AUDIA as manager of its ATLANTA, GEORGIA, territory.

Pennsalt Southern Repr.

COOPER M. SCHLEY has joined the sales organization of the PENNSYLVANIA SALT MANUFACTURING COMPANY. With headquarters in Birmingham, he will represent the Metal Processing and Maintenance Chemicals Departments in the company's Southern territory. He will handle products for the metal-working industries and a diversified line of metal cleaners and maintenance chemicals serving the transportation and manufacturing fields.

Mr. Schley received a degree in Mechanical Engineering from the University of Virginia in 1949, and before joining Pennsalt was associated with the Tennessee Coal & Iron Division of the United States Steel Corporation.

$4 Million Insulation Contr. for North Brothers—Atlanta

Contracts for furnishing and applying thermal insulation to the 11 steam generators, piping and equipment in the Ohio Valley Electric Corporation's two new steam-electric generating stations have been placed with NORTH BROTHERS, of ATLANTA, GEORGIA.

Contract, approaching $4 million, is believed to be one of the largest single orders for insulation ever placed in the electric industry's history. Insulating materials used will be Fiberglas and "Kaylo" supplied by Owens-Corning Fiberglas Corporation.

North Brothers, Southeastern industrial insulation contractor with headquarters in Atlanta, has branch offices in COLUMBIA, S. C.; KNOXVILLE, TENN.; SAVANNAH, GA.; BIRMINGHAM, ALA., and ORLANDO, FLA. Company service includes maintenance and new construction installation contracts as well as sale of materials for pipe, duct, boiler and cold storage insulation.

A-C Names Joyner—Atlanta

EDWARD M. JOYNER has been assigned to the ATLANTA district office of ALLIS-CHALMERS general machinery division.

Mr. Joyner is a 1952 electrical engineering graduate from Duke University. He recently completed Allis-Chalmers training course for graduate engineers.

Gulf States Paper Corp. Acquires New Alabama Site

GULF STATES PAPER CORPORATION and its Sales Division, the E-Z OPENER BAG COMPANY, TUSCALOOSA, ALABAMA, recently acquired a 1550 acre plant site on the Tombigbee River approximately eight miles from Demopolis, Alabama.

JACK W. WARNER, executive vice-president, said that the future construction of a pulp and paper mill at the new site would not preclude further expansion of the Tuscaloosa plant, but because of water conditions at Tuscaloosa, the construction of expanded manufacturing facilities would be given priority at Demopolis. He said that modernization of the Tuscaloosa mill, now in progress, will continue.

Insul-Mastic Appoints Carter-Bearden—Atlanta

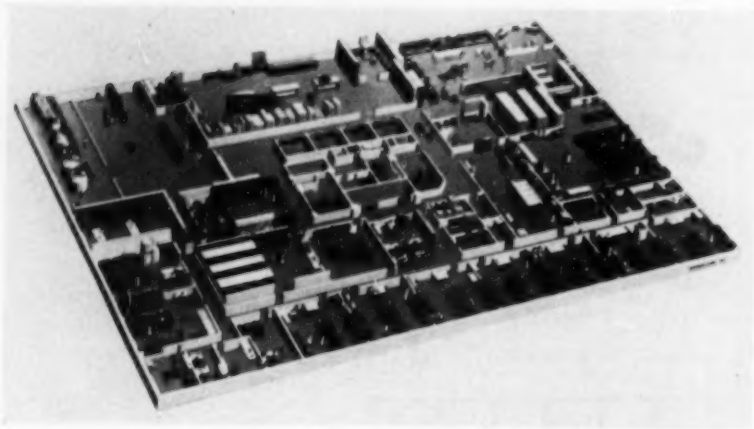
THE CARTER-BEARDEN COMPANY, 666 Greenwood Ave., N. E., ATLANTA, GEORGIA, has been appointed representative for the INSUL-MASTIC CORPORATION in the Atlanta area.

Carter-Bearden will employ Insul-Mastic heavy asphaltic protective coatings in industrial service for preventing corrosion, vaporsealing insulation, waterproofing building walls, and controlling condensation.

Hamer Valves—Southwest

THE RALPH H. STOCKTON COMPANY, 4101 San Jacinto St., HOUSTON, TEXAS, has been appointed exclusive sales agent for HAMER VALVES, INC., in Southern Texas. Ralph Stockton, who is well known for his knowledge of valves, and valve applications, was formerly with the Keystone Tool Company.

TOM S. ANDREWS, OKLAHOMA CITY, OKLA., has had his exclusive sales territory for Hamer Valves expanded to include New Mexico, Arkansas and Louisiana, as well as his previous coverage of Oklahoma, Kansas and north Texas.



Oakite Products' Expanded Research Facilities

OAKITE PRODUCTS, INC., New York, N. Y., specialists in industrial cleaning materials, methods and service, recently opened enlarged research laboratories.

Individual laboratories, devoted to bacteriological, analytical, organic, inorganic and special industry research run from center left across the bottom of the drawing.

The future pilot plant—where small quantities of materials will be manufactured for field testing—and the exhibit and engineering departments are at the top, and the customer service laboratory at center right. Wet-testing rooms, storage areas, conference rooms and offices are grouped in the center of the area.

The chemical research laboratory, manned by a staff of chemists and chemical engineers, working in 11 special laboratories, spearheads all new product developments. Here experienced personnel devote their time and talents to such specific things as bacteriological, inorganic, transportation and oil refinery, analytical, conversion coating, and organic research projects.

Raybestos-Manhattan—Md.

MANHATTAN RUBBER DIVISION, RAYBESTOS-MANHATTAN, INC., Passaic, N. J., has announced the appointment of HOWELL - LANIER ENGINEERING SALES, 4703 Ritchie Highway, BALTIMORE, MARYLAND, as metropolitan Baltimore distributors for Manhattan industrial rubber products. They will stock R/M industrial hose, transmission belts, V-belts, conveyor belts and other rubber products, and will provide engineering service on these.

Alcoa Power Plant—Tenn.

Plans for a new dam and hydroelectric power generating facilities on the Little Tennessee River, to be constructed by ALUMINUM COMPANY OF AMERICA under an agreement with the Tennessee Valley Authority, were announced recently by Ralph M. Ferry, general manager of the company's Tennessee operations.

The dam, to be operated at a point known as the Chilhowee site in Blount and Monroe Counties, Tennessee, will have a maximum height of 82 ft and a length of approximately 1,400 ft. It will create a reservoir about nine miles long, extending upstream to Alcoa's present Calderwood powerhouse. Electric power made available to Alcoa by the new generating facilities at Chilhowee will be used for aluminum smelting and fabricating at the company's Alcoa, Tenn., works.

The powerhouse, to be constructed at the dam site, will include three generating units having a total capacity of 70,000 hp. Cost of constructing the dam and powerhouse is estimated to be over $10 million.

Barrett Joins Byron Jackson

E. S. DULIN, president of BYRON JACKSON CO., announced the appointment of ROSS BARRETT to head an expanded department responsible for public relations, advertising and sales promotion. This department will also supervise market analysis for new BJ products and services.

National Pneumatic Names Ross Builders Supplies

The appointment of ROSS BUILDERS SUPPLIES, INC., GREENVILLE, SOUTH CAROLINA, as distributor for their new Economatic automatic door operator, has been announced by the NATIONAL PNEUMATIC INC. and HOLTZER-CABOT DIVISIONS, Boston, Mass.

Ross Builders Supplies, Inc. will serve textile mills, industrial plants, engineering consultants and construction firms throughout South Carolina and in the Asheville, North Carolina trading area. EMIL LANGSTON is sales manager.

Shell Chemical—Houston

H. E. HUGHES, chief engineer of SHELL CHEMICAL CORPORATION'S HOUSTON plant, has been appointed to the plant's new post of assistant superintendent—technical. In the new position Hughes will be charged with the establishment of a new engineering development department in the plant to apply technical skills and advanced engineering know-how to problems involving plant construction, inspection and maintenance. He will also assume administrative responsibility for the technological department and the plant laboratories.

J. W. HYDE, now assistant chief engineer, will succeed Mr. Hughes as chief engineer. C. W. DELONG, of the company's head office construction group, will replace Mr. Hyde.

Burroughs Corp.—Florida

ARTHUR H. LYNCH AND ASSOCIATES, P. O. Box 466, FORT MYERS, FLORIDA, has been appointed a manufacturer's representative by the BURROUGHS CORPORATION, Electronic Instruments Division, Philadelphia.

The Florida concern will handle sales of Burroughs Unitized Pulse Control Equipment and other electronic components and systems, in Florida.

News for the South and Southwest (continued)

Chemcot Expands—Tenn.

SOUTHERN CHEMICAL COTTON COMPANY, of CHATTANOOGA, TENNESSEE, one of the major producers of cellulose from cotton linters, is expanding its facilities by the addition of a new purification plant. Construction is under way, and operation is expected to begin in March, 1955. J. E. SIRRINE, GREENVILLE, S. C., are the engineers.

The entire purification plant is located in a single building to permit the closest possible supervision; and all equipment, including digester, brown stock and bleach washers, bleach mechanical equipment and towers, has been generously sized in order to provide adequate flexibility to process the many different grades of cellulose demanded by the trade.

All operations are to be controlled from a single graphic instrument panel, where the operator can visualize what is happening in all stages of the operation and can accurately control any or all phases of the process from this one place. The operator must make the initial setting for each phase of the process, but once selected the instruments maintain all conditions automatically.

Ernest Williams (r) foreman of Yarnall-Waring Steam Trap Department, shows one millionth impulse trap to (l to r) **B. G. Waring, D. Robert Yarnall** and **John F. McKee.** Mr. McKee is the inventor of the Impluse type steam trap.

One Million Traps—Watch for the Gold Bags

YARNALL-WARING COMPANY, Philadelphia manufacturer of steam plant equipment, has produced its one millionth Yarway Impulse Steam Trap. To commemorate this event, Yarway is specially packaging in gold bags, 100 standard Yarway Impulse Steam Traps and including them at random in regular shipments throughout the country. Recipients of these traps will receive special prizes.

Introduced in 1935, the Impulse Steam Trap gave industry a unique steam trap, operating on a principle of thermodynamics never before used in steam trap design—that variations in temperature of water discharging through two orifices in series cause variations in pressure in an intermediate chamber located between the orifices. In the Impulse Trap, this principle is employed to operate the only moving part in the trap, a small stainless steel valve.

Continued research and development work has led to additional variations of the Impulse Trap for extra high capacities, small condensate loads, extra high pressure trapping in power plants, marine services, etc. In 1949, a major improvement was the adoption of stainless steel for Yarway steam trap bodies, at no increase in price.

Shell Chemical—Norco, La.

A. N. SMITH, senior industrial relations analyst for SHELL OIL COMPANY in New York, has been appointed manager of personnel and industrial relations at the SHELL CHEMICAL CORPORATION plant under construction at NORCO, LOUISIANA.

Smith was born at New Orleans and received a B.S. degree in chemistry from Loyola University there. He joined Shell in 1941 at the Norco refinery and advanced through positions of increasing responsibility as a technologist. He was transferred to New York in 1951 as a training representative in personnel administration. He was promoted to senior analyst in 1953.

Republic Rubber—Mobile

THE JACKSON SUPPLY COMPANY, 6 South Commerce St., MOBILE, ALABAMA, has been appointed an Accredited Distributor of the REPUBLIC RUBBER DIVISION, LEE RUBBER & TIRE CORPORATION, Youngstown, Ohio.

The company will carry a complete stock of Republic's line of hose, belting and packing and will have engineering and service help from W. R. FOLEY, Republic's Field Engineer and from F. D. BOWERS, Republic's Southern District Manager.

Chain Belt—Dallas, Texas

CHAIN BELT COMPANY, Milwaukee, Wis., announces the appointment of DEANE TREAT as sales engineer in the DALLAS, TEXAS, District Sales Office. Mr. Treat, who recently completed an intensified 14 week sales training course at the company's home plant, will represent Chain Belt in the sales of chain, sprockets, bulk material handling equipment, bearings, and sanitation equipment.

Parker Promotes Atkinson

Promotion of J. H. ATKINSON, 5805 Schumacher Lane, HOUSTON, TEXAS, formerly Parker sales engineer in Houston, to district manager for the States of TEXAS, NEW MEXICO, LOUISIANA, ARKANSAS and MISSISSIPPI, is announced by THE PARKER APPLIANCE COMPANY, Cleveland, Ohio.

Atkinson's representation will encompass Parker synthetic rubber o-rings as well as tube and hose fittings and industrial hydraulic. He will work closely with Parker distributors.

Commercial Solvents Expansion—Louisiana

COMMERCIAL SOLVENTS CORPORATION has awarded the contract for construction of its new large scale Nitroparaffin plant to the Ford, Bacon and Davis Construction Corporation of Monroe, Louisiana. Construction of the five million dollar facility at STERLINGTON, LOUISIANA, has already started and the new plant, the first major step in the company's Nitroparaffin expansion program, is expected to go on stream August, 1955.

The company is presently producing and marketing limited quantities of Nitroparaffins and derivatives, which have already achieved a wide range of applications in chemical and chemical process industries. The construction of full scale Nitroparaffin facilities is another stage in Commercial Solvents' long term petrochemical development. Last winter, a 20 million dollar expansion of its methanol, ammonia and nitric acid plant was completed at Sterlington, the construction also being handled by Ford, Bacon and Davis.

Walter Gearhart and Richard Osgood head up Gearhart Company operations.

Gearhart Company Expands Engineering Sales Agency

THE GEARHART COMPANY, Box 85, Northside Station, ATLANTA, GEORGIA, has announced several personnel additions, and expanded warehousing and repair facilities to serve major industrial, power, and large service plants in the Carolinas, Tennessee, Georgia, Alabama and Florida.

WALTER V. GEARHART, founder of the company in 1926, is now chairman of the board and chief executive officer, and RICHARD H. OSGOOD is president.

Mr. Osgood recently joined the

Gearhart organization following nine years as southeastern district manager for the General Cable Corporation, and previously, nineteen years with the Okonite Company.

Other officers of THE GEARHART COMPANY include J. ROBERT DAVID, executive vice president; ELWYN G. RILEY, vice president and transformer consultant; J. H. REID, motor and generator consultant; and WM. E. BELL, office and warehouse manager.

The company has considerably expanded warehouse and service facilities for the electrical equipment manufacturers it represents. Gearhart's accounts include: DUNCAN ELECTRIC MFG. CO., watthour meters; ESTERLINE-ANGUS CO., recording instruments; THE SUPERIOR SWITCHBOARD & DEVICE CO., THE EASTERN SPECIALTY CO., test instruments; PENNSYLVANIA TRANSFORMER COMPANY DIVISION of McGraw Electric Co.; T. J. COPE, INC., cable troughs; EUCLID ELECTRIC & MFG. CO., electric motor controls; ELECTRIC PRODUCTS CO., motor generators and specialties; AUTOMATIC CONTROLS, liquid level controls; and DYNAMATIC DIV. EATON MFG. CO.

J. G. Sylvester Forms New Engineering Firm

JAMES G. SYLVESTER, formerly Head, Research Laboratory Division of Mutual Boiler & Machinery Insurance Co., has announced the establishment of J. G. SYLVESTER ASSOCIATES, Consulting Engineers, specializing in industrial radiography. Offices are maintained at 44 Clarendon St., South Weymouth, Mass.

Mississippi Chemical Corp. Increases Ammonia Capacity

Three expansion projects—one completed and two under way—will increase the ammonia production capacity of the MISSISSIPPI CHEMICAL CORPORATION'S plant in YAZOO CITY, MISS., from 120 tons to a total of 290 tons per day. All of the increased output will be used as fertilizer. A part of it is to be distributed as anhydrous ammonia, and a part is to be converted to ammonium nitrate.

THE GIRDLER COMPANY, LOUISVILLE, KY.—a division of the National Cylinder Gas Company—is performing the design, engineering and construction services for additional synthesis gas generating and purification facilities. Girdler also engineered and built the original plant, which went on stream in 1951.

Announcing

An Outstanding Offer...

"PLANT MAINTENANCE"—A BIG NEW 135-PAGE MANUAL OF PRACTICAL SOLUTIONS TO MAINTENANCE PROBLEMS *PLUS* 36 VALUE-PACKED ISSUES OF *SOUTHERN POWER AND INDUSTRY* FOR ONLY $3.00

Contents include informative articles on such diversified maintenance subjects as: "One Card Maintenance System"; "How to Reduce Corrosion Costs"; "Caustic Embrittlement in Boilers"; "Graphitization"; "Cable Splicing System"; "Damaged Conveyor Belting"; "Display Board Guides Electricians"; "Plastic Pipe"; "The Alignment of Shafts" and many others—ninety-three in all.

Everywhere today we hear from industrial men about the ever-lowering profit margin and the need for more efficient production methods . . . decreasing costs . . . minimizing waste . . . increasing profits . . . the need, in short, for a well-rounded, smoothly-functioning maintenance program which insures better productivity.

That's why companies are searching for more efficient maintenance methods and materials. If they are to sustain even a minimum profit level, many of them must step up maintenance and improve procedures.

A BETTER-MAINTENANCE "MUST"

Engineers in Southern industrial, power, and large service plants will find answers to many of their maintenance problems in "Plant Maintenance", the great new book just released by S.P.I. Composed of nearly a hundred selected articles on plant maintenance—reprinted from recent issues of SOUTHERN POWER AND INDUSTRY—"Plant Maintenance" presents in concise, convenient, and readable form a wealth of up-to-the-minute, time-saving tips to the engineers responsible for plant up-keep in Southern and Southwestern industrial organizations.

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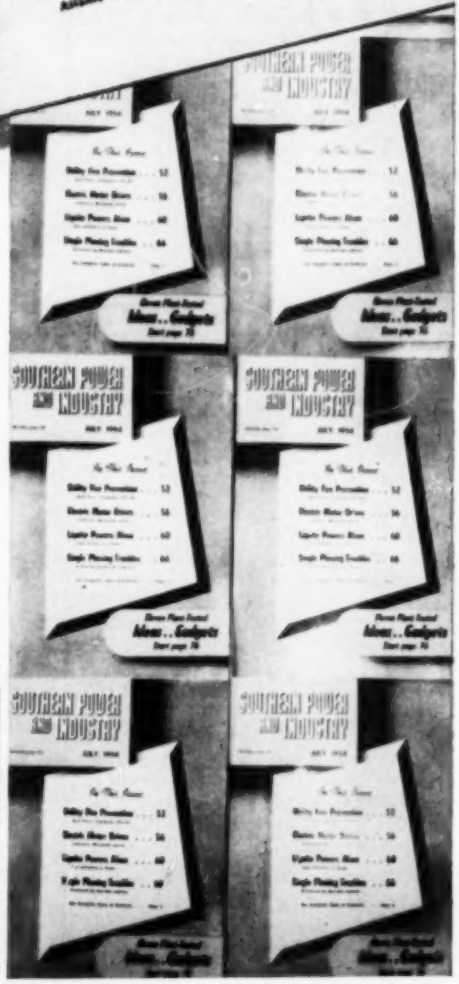

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Dixie Mfg. Co. Completes New Baltimore Plant

DIXIE MANUFACTURING COMPANY, long-established BALTIMORE metal-working firm, has completed its removal to a newly-erected modern plant at 1501 W. Patapsco Ave. Since 1910 the Company had been at 1800 Russell St. at the B. & O. Railroad. The need for larger working quarters prompted the firm to select the new location.

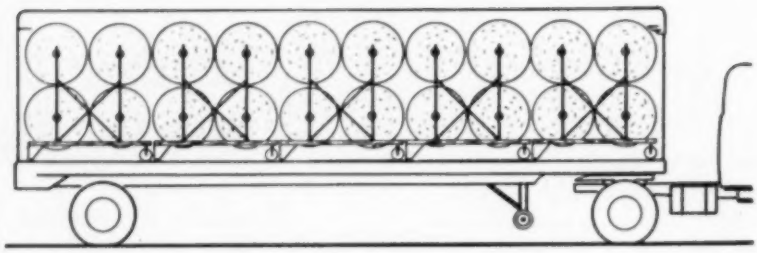
Covering 33,000 square feet, the new building occupies nearly twice the area of the former Dixie plant. In addition to increased size, the new plant features single-floor construction at ground level, which permits drive-through of trucks when necessary. Handling of heavy material is greatly expedited by the layout which permits the use of a five-ton overhead electric crane. This crane has a fifty-foot span, and an unimpeded travel of two-hundred-and-fifty feet.

Dixie Manufacturing Company was founded in 1890, in Cambridge, Mass., by James W. Toohey. In 1900 a plant was established in Greensboro, N. C., and in 1904 the business moved to Baltimore, where it has been in operation ever since. In recent years the Company has become recognized in the fabrication of stainless steel, and manufactures many items used in laboratories and hospitals.

Rawson & Co.—Houston

Formation of RAWSON & CO., which will offer sales, service, and warehousing facilities to manufacturers interested in the petro-chemical industrial trade area of Texas and Louisiana, has been announced by W. BRANT RAWSON, 4101 San Jacinto, HOUSTON, TEXAS.

Mr. Rawson recently resigned from Maintenance Engineering Corporation of Houston after being associated with the company since 1927 and having been vice president for the past twelve years. He was in charge of sales and service of such mechanical equipment as Mason-Neilan Regulators, A. O. Smith meters, and commercial orifice fittings. He is widely known in the oil, chemical, paper and power industries of Texas and Louisiana. He was graduated from Rice Institute in 1926.



New Wrinkle in Blankets

THE conventional method of transporting blankets from woolen mill to electric blanket manufacturer is by means of individually folded blankets stacked in corrugated boxes and shipped by road or rail.

The Automatic Blanket Department of the General Electric Company has introduced an entirely novel method for transporting their unwired blankets from the vendor to the G. E. Automatic Blanket Plant in Asheboro, North Carolina.

Blankets, when in the process of manufacture, exist as continuously woven strips approximately two hundred feet or more in length. A final operation consists of cutting these strips into individual blankets.

The new G. E. transport method delivers the blanket material while still in the strip form. In essence, these strips are wound onto steel cores, about one hundred blankets being contained on each core. Four of these units, which are referred to as blanket rolls, are then racked in especially constructed steel dollies. These dollies, in turn, are designed to fit and lock into a custom-built, oversize trailer as illustrated. The trailer capacity is two thousand blankets. The driver unloads and places into storage this entire load in a five-minute period, the dollies also being utilized for storage.

The annual savings to the G. E. Blanket Department is substantial. This project paid for itself in four months of operation.

By H. W. WALLACE, Manufacturing Engineer, General Electric Company, Small Appliance Div., Asheboro, N. C.

THIS EQUIPMENT and method permit better and faster packaging.

Mechanized Packaging

THE Cudahy Packing Company plant in New Orleans is one of the first in the area to install equipment to automatically evacuate and heat-seal packages of sliced meat.

The meat products are sliced automatically, then travel by conveyor belt to a work station where the slices are manually inserted into flexible, plastic envelopes.

The unsealed envelopes are next placed into one of the eight rotating compartments of the "Flex-Vac" machine. Here the air is effectively removed by the action of a 7½ hp vacuum pump that maintains a vacuum of 29.7 inches of mercury.

After removal of the air is complete, limit switch contacts actuate a 1000 watt electric heater which seals the ends of the plastic pack-

ages. Thermostatic controls maintain the proper sealing temperature regardless of the rate of operation of the equipment.

The rated capacity of this packaging unit is 1200 6 oz packages per hour. The entire operation is housed in a room in which a temperature of 40-45 F is held in order to lessen the possibility of the deterioration of the various meat products packaged.

By J. M. JENNINGS, JR., Industrial Engineering & Utilization Department, New Orleans Public Service Inc.

How Photography Aids Maintenance

(*Starts page* 78)

is a necessity. You may find in the beginning that light reflected, as indicated by the meter, does not check with the results on the negative. We have found that shooting subjects from a distance (about 10′) that the meter tends to give an over-reading, and in extreme close-ups the meter tends to give an underreading. A little experimenting will tell you about exposing, and possibly your exposure will not be so far afield as to be worthless.

Film

For film, we use Plus X because it is a medium speed film of fine grain. Consequently it provides good definition of details, such as cracks, scratches, and other small defects, on machine parts.

This film may be subjected to short time developing procedures and a good negative be produced; another point which we prefer. This is primarily why we use Plus X, and we have not felt it necessary to change to other films.

Another reason in favor of X is the film pack feature. When loading film in camera you only have to disturb your camera once after setting up for your picture. We always make two exposures, and sometimes three at slightly different apertures. For important photographs, we always make more than one exposure of the subject. It is a long way from exposure to finished print, and one exposure could be ruined.

WHAT'S NEW and Where to Get It

FOR FREE INFORMATION—Circle code number on page 17 or 18

X-1 **WATER CLARIFICATION** — Catalog 200, 28 pages—A thorough, technical discussion of a new approach to the solution of stream pollution problems. Causes of water pollution (sizes finer than #150 to #200 mesh) can be isolated by a combination of mechanical screening and hydraulic classification. Water clarification process described is based on gravity. Technical data deals primarily with integration of coal preparation and water clarification processes. However, materials other than coal will also respond to the same or similar treatment.—HAWORTH ENGINEERING & MANUFACTURING COMPANY, 920 Second Ave., No., Birmingham 4, Ala.

X-2 **STEEL BUILDINGS** — Catalog No. 2, 26 pages—Photographs show Star steel buildings in use by specific plants in various industries including warehouses, gins and mill buildings, factories, and many others. Construction details are explained; and building components, estimating data sheet, sample floor plan, and engineering service are covered.—STAR MANUFACTURING COMPANY, 3012 South Stiles, Oklahoma City, Okla.

X-3 **STEEL CASTINGS** — Bulletin, 4 pages — Illustrates and describes high quality carbon and alloy steel castings available for a variety of industrial uses. Photographs show plant facilities, and engineering and design services for particular applications are offered.—TEXAS STEEL COMPANY, 3201 Hemphill St., Fort Worth, Texas.

X-4 **ELECTRIC HOISTS**—Bulletin 618-9-4, 6 pages — Describes electric hoists for big lifts, 4 to 15 ton capacities, featuring load-inching controls and light, compact design. Plant photographs show specific applications of equipment, and cutaway view gives construction details and components.—R. G. LeTOURNEAU, P. O. Box 2037, Longview, Texas.

X-5 **STEEL TANKS**—Catalog, 52 pages —Gives examples of production and custom steel fabrication offered in storage tanks, fuel tanks, all types of refinery vessels, transport tanks, expanded linepiped anhydrous ammonia systems, and other plant equipment. Extensively illustrated with plant and equipment photographs.—MASTER TANK & WELDING, P. O. Box 5146, Dallas, Texas.

X-6 **LEAK PREVENTION**—Bulletin, 6 pages—Describes "Rectorseal #2," a liquid chemical compound impervious to all petroleum fractions, for use as a sealing for thread and gasket connections. Gives ordering data, including prices. Lists wide range of applications, with service chart.—RECTOR WELL EQUIPMENT CO., INC., Rectorseal Division, 2215 Commerce St., Houston 2, Texas.

X-7 **PIPE COVERING**—Bulletin, 6 pages —"Walex" corrosion resistant permanent aluminum pipe covering is described. Photographs show four steps necessary for simple application. Gives specifications and tells how insulation is protected and labor costs are cut.—WALEX METAL PRODUCTS COMPANY, 1202 West 14th St., Houston 8, Texas.

X-8 **COOLING TOWER TEST**—Technical Bulletin R-54-P-5, "Test Your Tower," 20 pages—Describes a simple, direct method by which the purchaser of an industrial cooling tower can test its performance. Plant photographs illustrate procedure, and performance charts and rating factor diagrams are given.—THE MARLEY COMPANY, Technical Services Dept., 222 W. Gregory Blvd., Kansas City, Mo.

X-9 **CHEMICAL CLEANING**—Bulletin, 4 pages—Offers a solution to the problem of deposits in piping systems by the company's chemical line cleaning service. Line drawings show use of chemical method, pipe line pig, and jet moles. Photographs and case histories are included.—DOWELL INCORPORATED, P. O. Box 536, Tulsa 1, Okla.

X-10 **MATERIALS HANDLING**—File No. F-2, 28 reports—New series of 8 case studies on engineered application of monorail equipment includes core sand delivery, reduced cost in small die shop, automatic bobbin box transfer, order make-up and packing, coal and ash handling, sausage handling, and reduction of car loading time. — AMERICAN MONORAIL CO., 13105 Athens Ave., Cleveland 7, Ohio.

X-11 **BELT POWER TRANSMISSION**—Brochure No. 6638, 8 pages—Explains design characteristics of the "Poly-V" drive, a single, endless belt with molded lengthwise ribs. Discusses advantages including increased contact area, more horsepower, reduced face pressure, constant effective pitch diameter under shock loads, and other features. Gives selection data.—MANHATTAN RUBBER DIVISION, RAYBESTOS-MANHATTAN, INC., Passaic, N. J.

X-12 **ELECTRICAL HEATING**—Bulletin, 8 pages—Describes the "Heatflex" copper-clad electric heating element that can be formed without tools to any surface immersed in any solution or material noncorrosive to copper, enclosed wherever built-in heat is desired, and operated at temperatures below freezing to 482 F. Includes applications and specifications. — CONTINENTAL ELECTRIC EQUIPMENT CO., P. O. Box 1055, Cincinnati 1, Ohio.

X-13 **PNEUMATIC HANDLING** — Bulletin G-2, 16 pages—Lists 86 dry pulverized materials and indicates which pneumatic handling system is best adapted to handle each. Describes the rotary compressor, the clinker cooler, and the new kiln preheater. Photographs show typical plant applications.—FULLER COMPANY, Fuller Bldg., Catasauqua, Pa.

X-14 **CHAIN DRIVES**—Folder 72-54, 6 pages—Describes detailed installation and maintenance procedures for "Hy-Vo" high speed heavy duty chain drives for 50 to 5,000 hp drive applications. Covers sprocket installation, chain assembly, chain cases, lubrication and other pertinent data. Illustrated with line drawings.—MORSE CHAIN COMPANY, 7601 Central Ave., Detroit 10, Mich.

X-15 **WIRE MARKERS** — Bulletin No. 130-B, 8 pages—Describes new self-adhering wire markers that withstand continuous heat to 300 F, intermittent heat to 450 F, and continuous cold to —300 F, indefinitely. Discusses application in electrical maintenance work, and gives stock list and prices.—W. H. BRADY COMPANY, 727 West Glendale Ave., Milwaukee 12, Wis.

X-16 **BOILER BAFFLES**—Bulletin BW-54, 20 pages—Data on modern boiler baffles, designed for streamlined flow of the gas of combustion over the heat-absorbing surfaces. Shows more than 30 boiler setting plans, with an analysis of each arrangement. Covers basic boiler construction and numerous variations of each design.—THE ENGINEER COMPANY, 75 West St., New York 6, N. Y.

X-17 **SHAFT MOUNTED DRIVES**—Bulletin 7101, 8 pages—Covers shaft mounted drives for machines requiring input speeds between 420 and 10 rpm, and from ½ to 30 hp, including design data, selection tables, dimensions, weights, installation photographs, and other pertinent information. — THE FALK CORPORATION, 3001 W. Canal St., Milwaukee 8, Wis.

X-18 **BATTERY MAINTENANCE**—Training Manual, 44 pages — Prepared to enable users of lead-acid storage batteries for electrical industrial trucks to organize battery maintenance training programs in their own plants. Comprehensive material is divided into 10 sections for a course to cover five or ten sessions.—GOULD-NATIONAL BATTERIES, INC., Trenton 7, N. J.

X-19 **VALVES AND PACKINGS**—Catalog No. SC-510, 14 pages—Describes pump valves, including standard types, lock-in types and deck types; gives key features, case histories, and ordering data. Graphite packing rings and husheaters are also covered, with installational and applicational data and case histories.—SIMS PUMP VALVE CO., INC., 1314 Park Ave., Hoboken, N. J.

X-20 **WATER TESTING EQUIPMENT**—Bulletin, 12 pages—Guide to line of titration stands and test sets for hardness, alkalinity, chloride, sulfite, etc.; cabinets and test sets for similar tests; "Conducto Bridge" for determination of specific conductance of water solutions; colorimetric comparators; and photometer for water analyses.—W. H. & L. D. BETZ, Gillingham and Worth Sts., Philadelphia 24, Pa.

X-21 **RAMPS AND PALLET STACKERS** —Broadside, 6 pages—Catalogs materials handling equipment including all-steel ramps for 15,000 lb, 4,000 lb and 2,000 lb capacity, with specifications and modifications. Describes pallet stackers, and conversion kits, with specific applications of each. Contains photographs, line drawings, and tables.—ELIZABETH IRON WORKS, INC., P. O. Box 360, Elizabeth, N. J.

X-22 **PROCESS INSTRUMENTATION** — Catalog 1, 12 pages—Illustrations, descriptions, and basic specifications for complete line of instrumentation for measuring and controlling process variables, including flow meters; pressure instruments; instruments for liquid level; density and specific gravity; and other items.—FISCHER & PORTER COMPANY, 172 Jacksonville Road, Hatboro, Pa.

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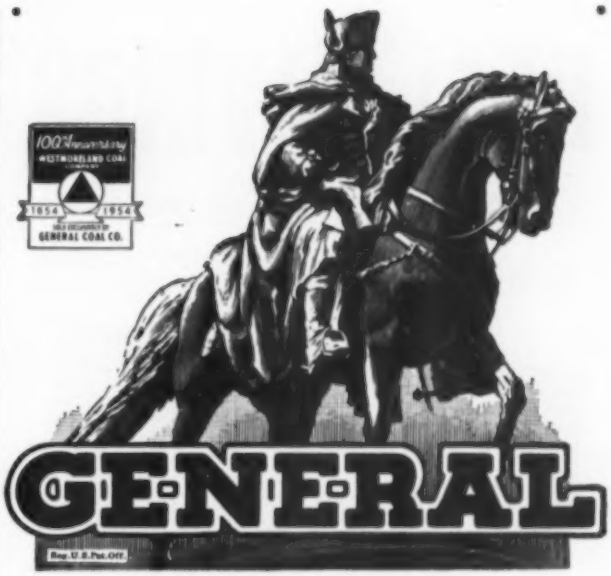

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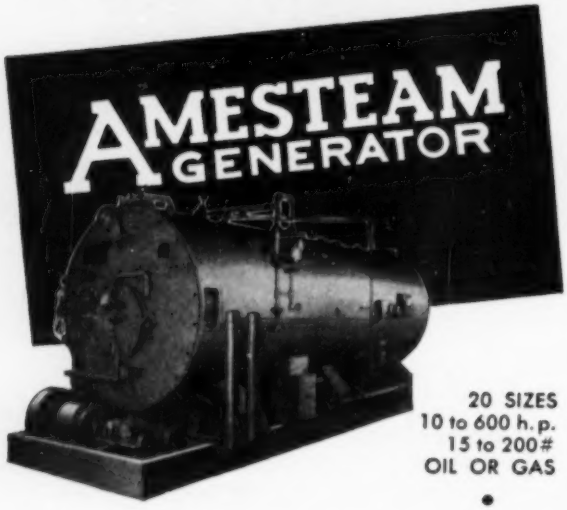

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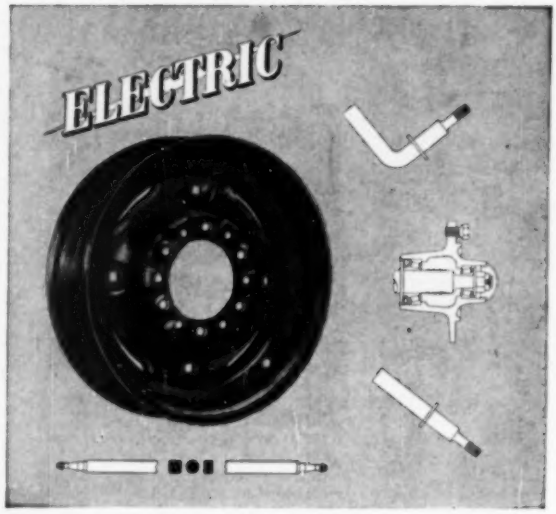

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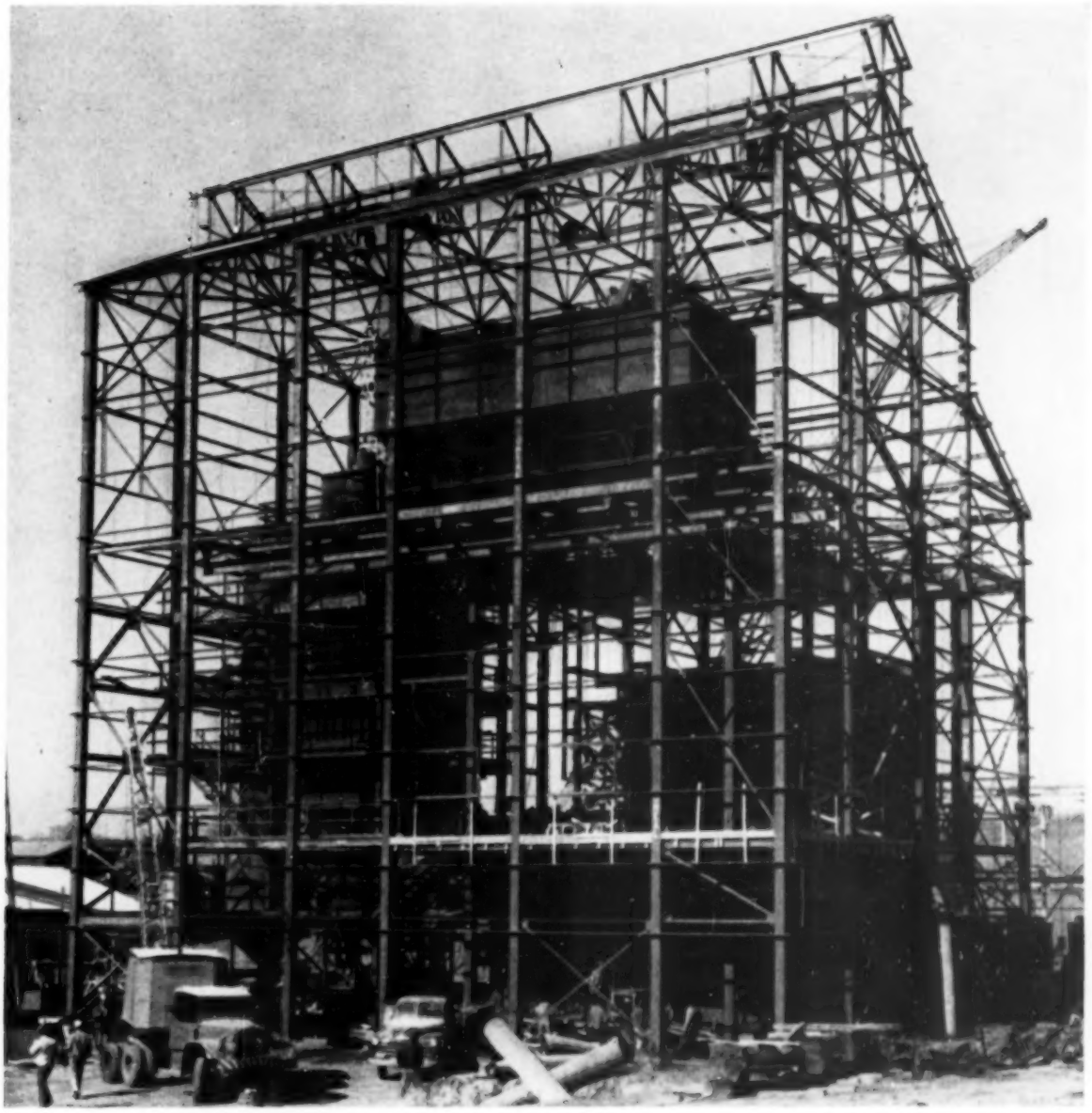

O'NEAL builds Chemical Plants

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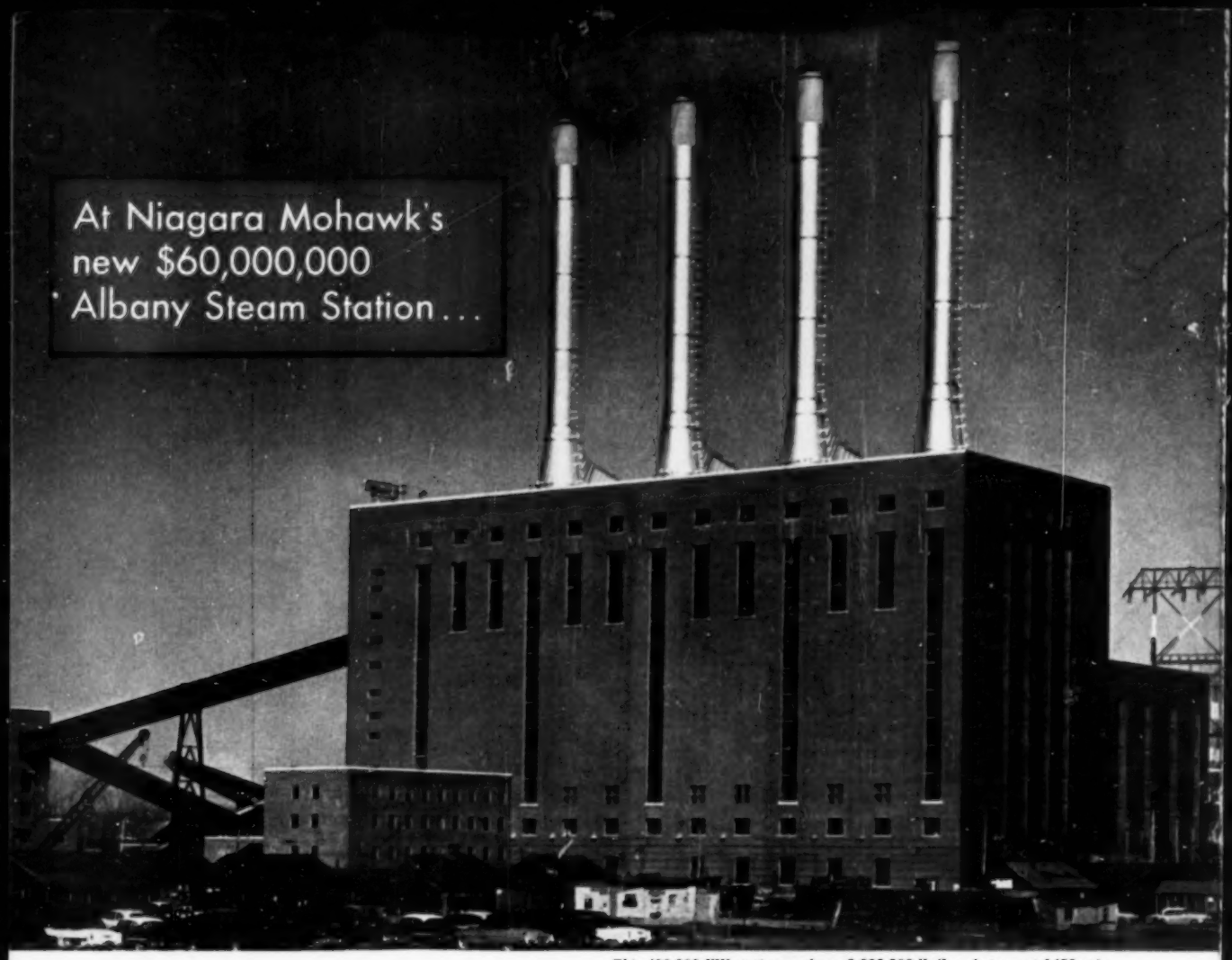

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